

PRODUCT SENSE

Product Manager: set up the roadmap

Data scientists help with decision making & measuring performance. We need to understand what is happening internally within the product.

Product sense interview

product cases

- Product knowledge
- product execution
- Applied statistics

Business intuition

ABILITY TO INFLUENCE THE PRODUCT

USE THE PRODUCT

UNDERSTAND PRODUCT FROM BUSINESS PERSPECTIVE

product sense questions

Measure product quality e.g. How would you measure success of feature/product?

feature change

Metric Investigation e.g. Amazon revenue decreased this month. What would you do?

Metric trade-off

product improvement

e.g. How would you improve WhatsApp?

growth

HOW TO GROW/IMPROVE PRODUCT

THINK LIKE SOMEONE WHO ALREADY WORKS WITH THE PRODUCT

Requires in-depth knowledge of product

Series of statistical tests to validate if the idea should be launched or not.

1. Demonstrate product knowledge by providing a product overview
 2. provide a sound product execution
 3. Demonstrate data intuition
 4. Be statistically sound
 5. Understand problem clearly
 6. Explain thought process clearly.
- } product sense
- } Technical knowledge
- } communication

BASICS

① Empathy : Ability to understand & feel what a user is experiencing

→ products are designed to solve a users' problem

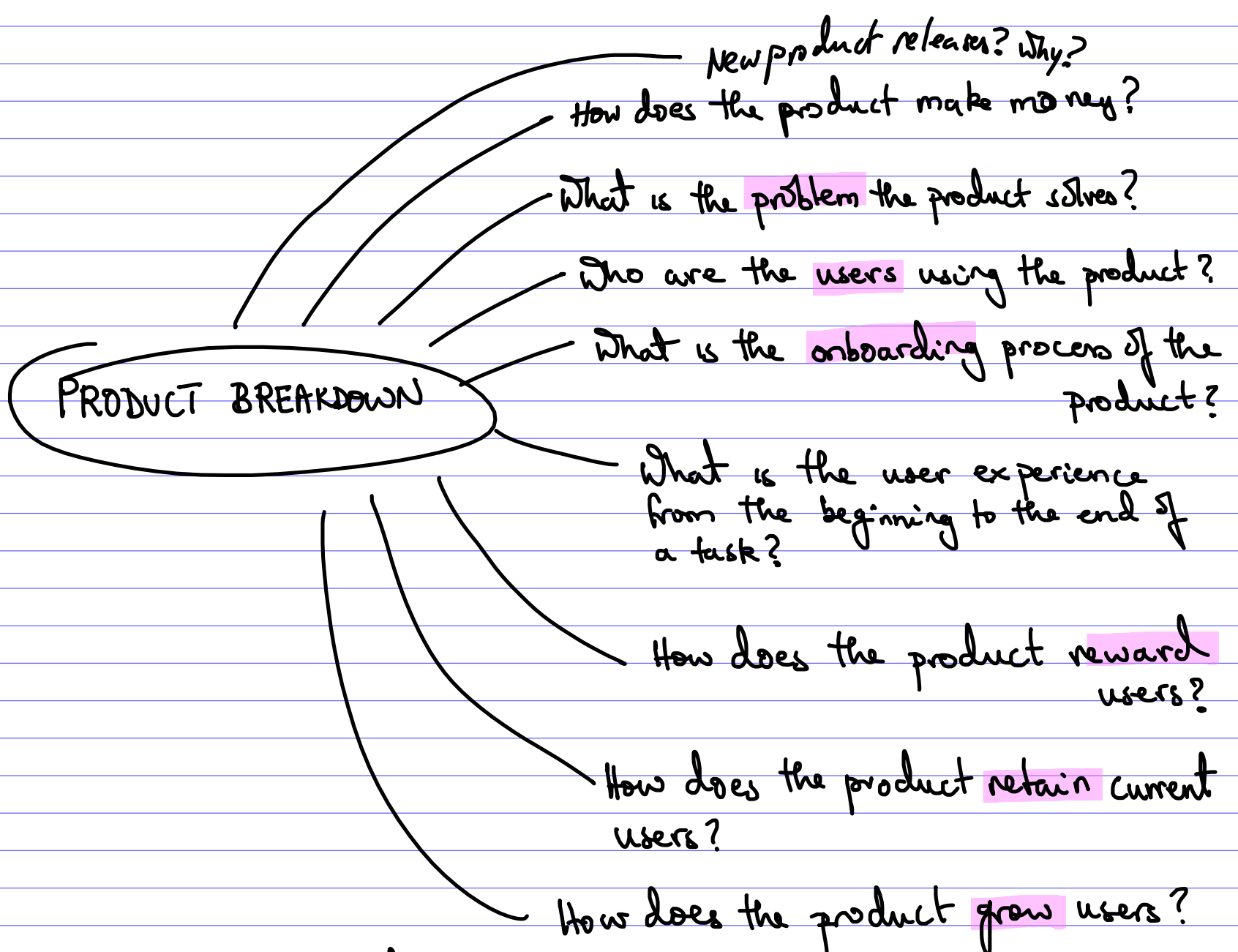
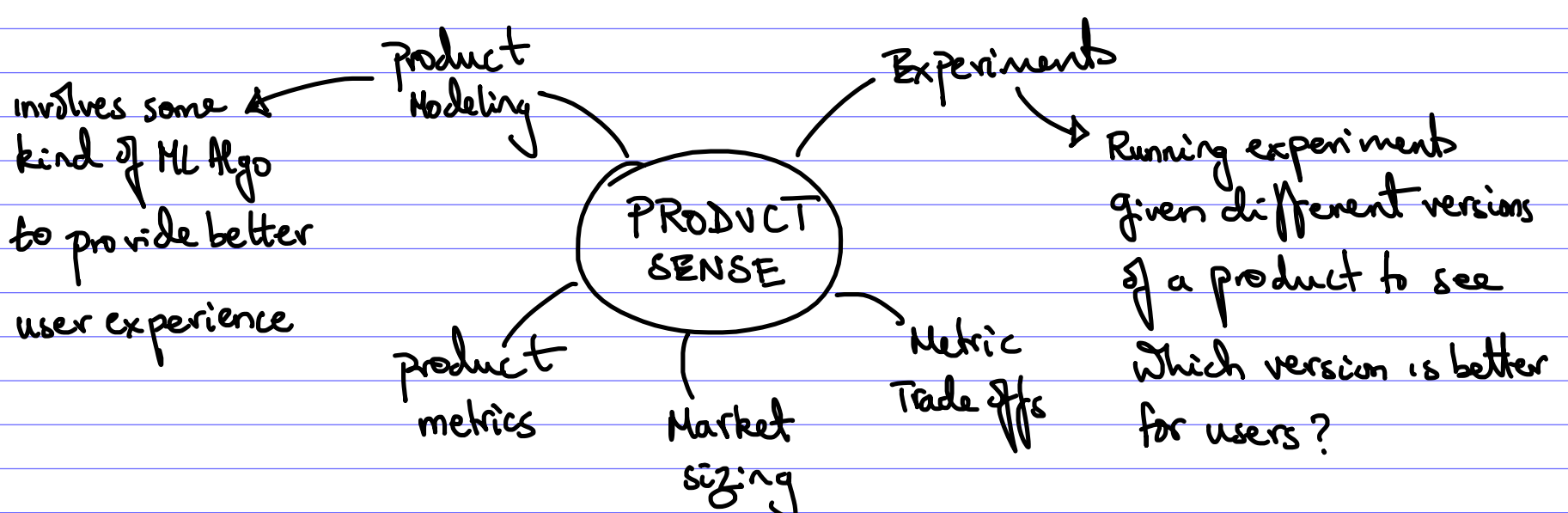
→ At present, what path is the user taking to achieve a particular task? How can we create a product to streamline the process for users?

* pain points

efficiency

effectiveness

② Execution : Ability to solve a user problem with product decisions using ideation, analytics & experiment



e.g. Facebook News Feed

→ Product [specific feature in facebook]

1. Curates Content [Helps save users time in finding content related to them or are interested in]

2. Facebook users

3. Email Sign-up

4. Journey:

- scroll
- React
- Comment
- share

5. Reward: stay connected / Exposed to the local & international current affairs.

6. Retention: Notifications

7. Growth: sharing posts across users

PRODUCT METRICS

★ Can't measure → Can't Improve

① Product Vision : What is the main goal of the product?

→ What is the company's mission/purpose/focus?

(organization lvl) → Why should it exist?
(Qualitative) → What does it offer to the world?

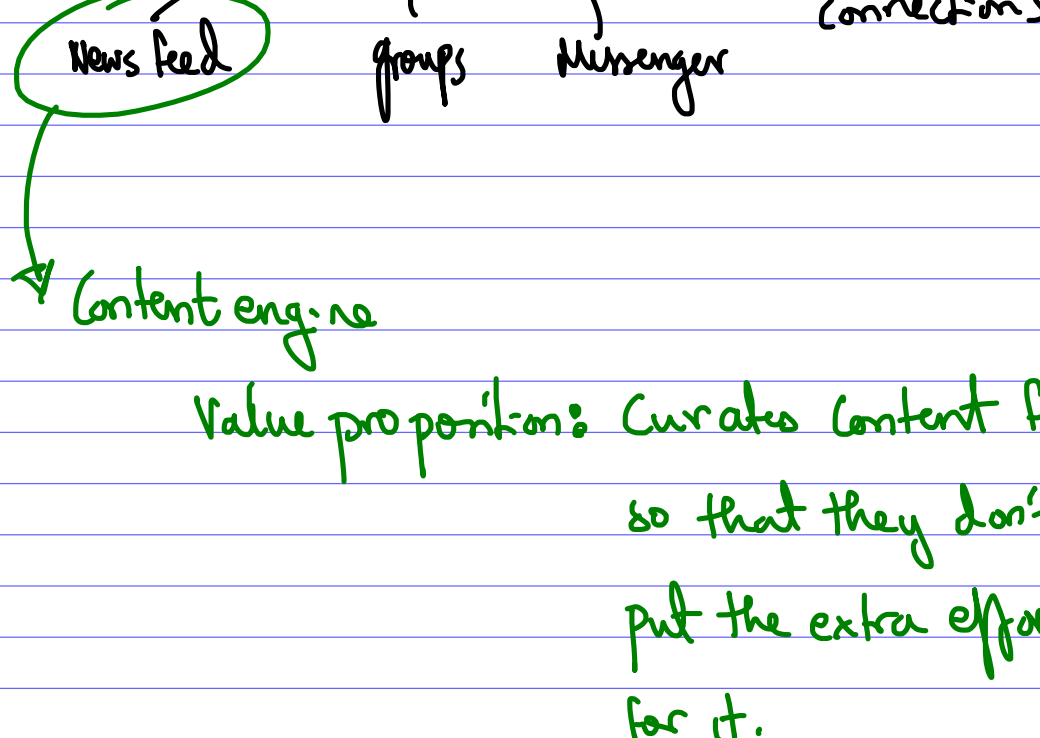
e.g.

- 1) Google: To organize the world's info & make it universally accessible & useful
- 2) Meta: To give ppl the power to build community & bring the world closer together
- 3) Netflix: To entertain the world

→ What value does the product offer to users?

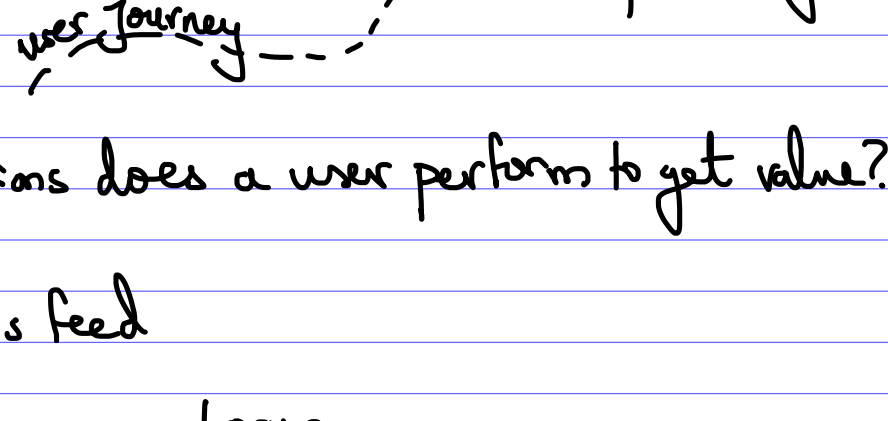
Value proposition: a statement that clearly identifies the benefits a company's products & services will deliver to its customers.

e.g.



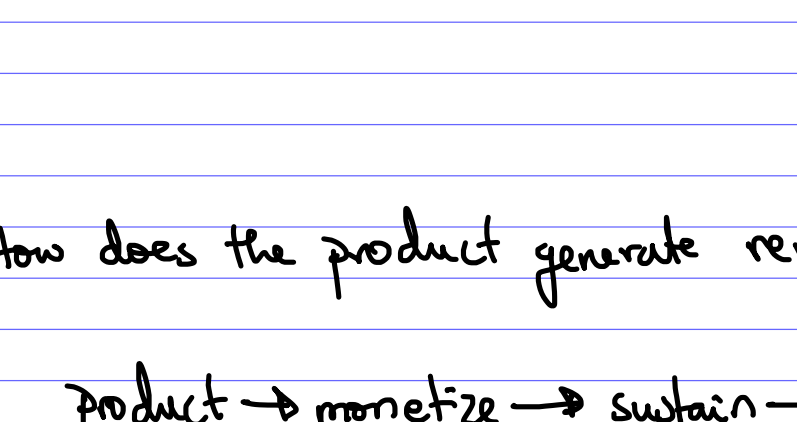
★ Defining clear goals can guide us in deciding what could be the main product metric.

→ What steps does a user take to achieve success?



What actions does a user perform to get value?

e.g. News Feed



→ How does the product generate revenue?

product → monetize → sustain → Help users

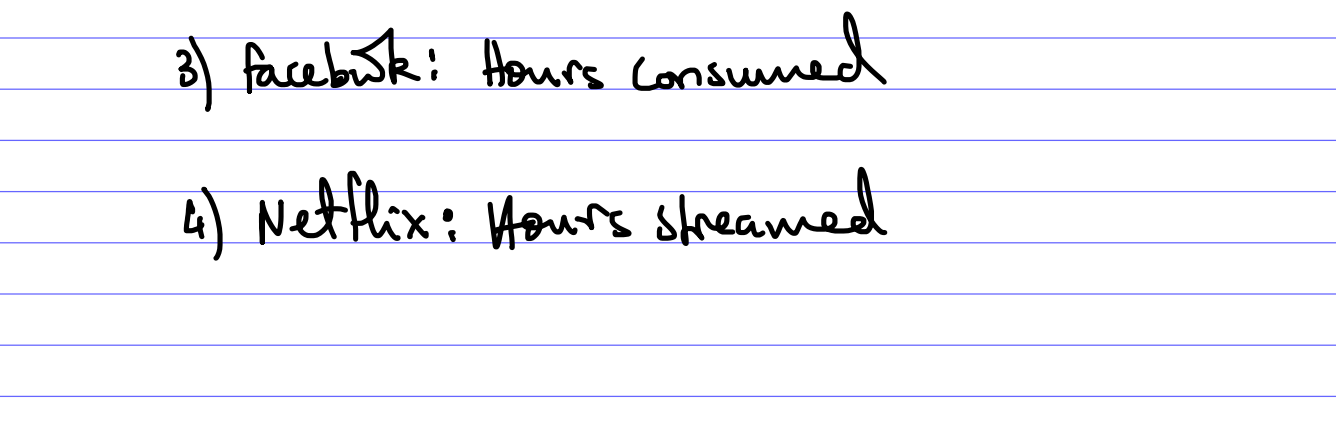
e.g. News Feed

Advertiser → Publish → click → Revenue

② North Star Metric : What is the primary metric that measures the success of a company?

KPI : **key performance Indicator**

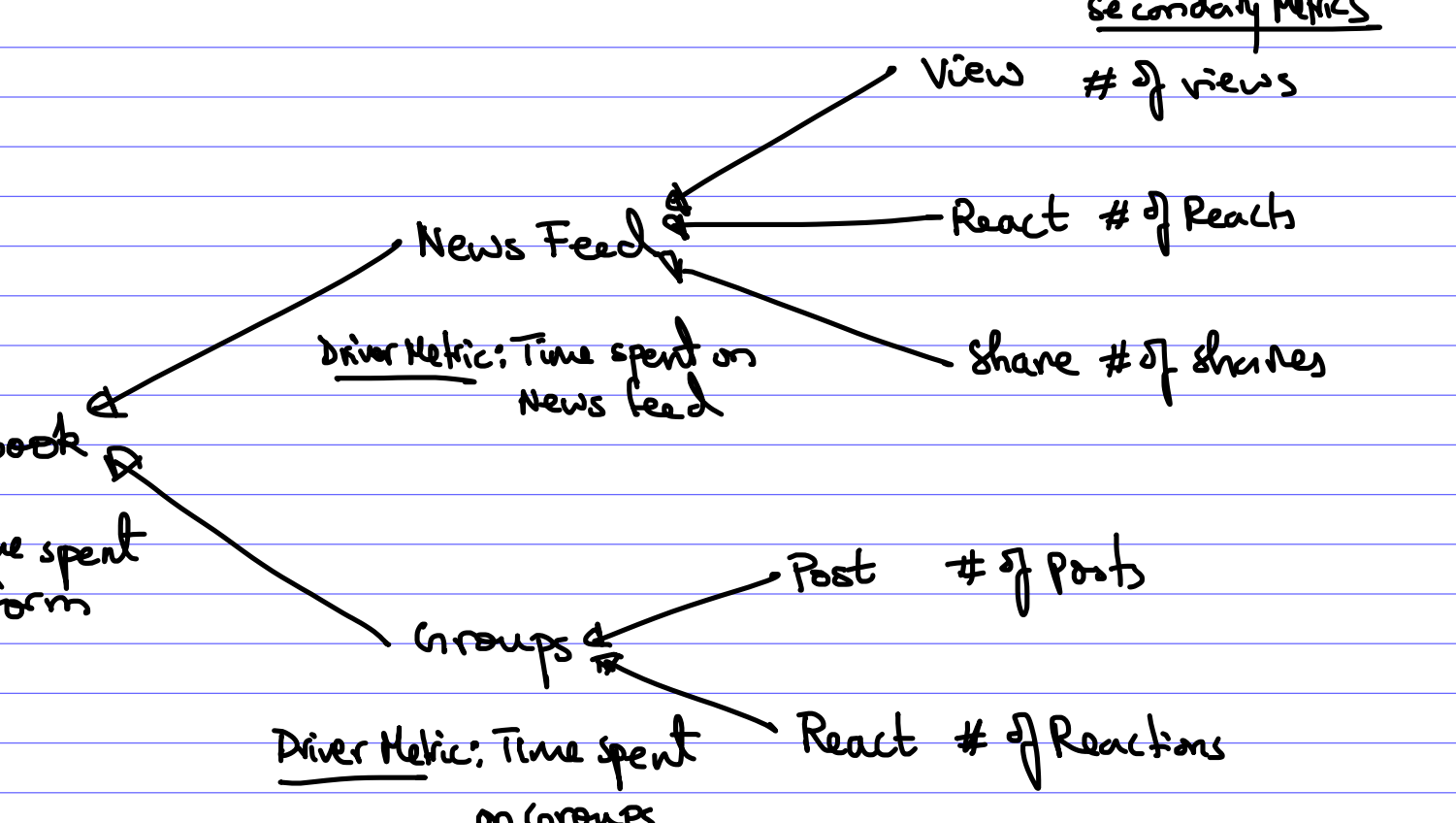
The primary KPI that best aligns with the company's mission statement.



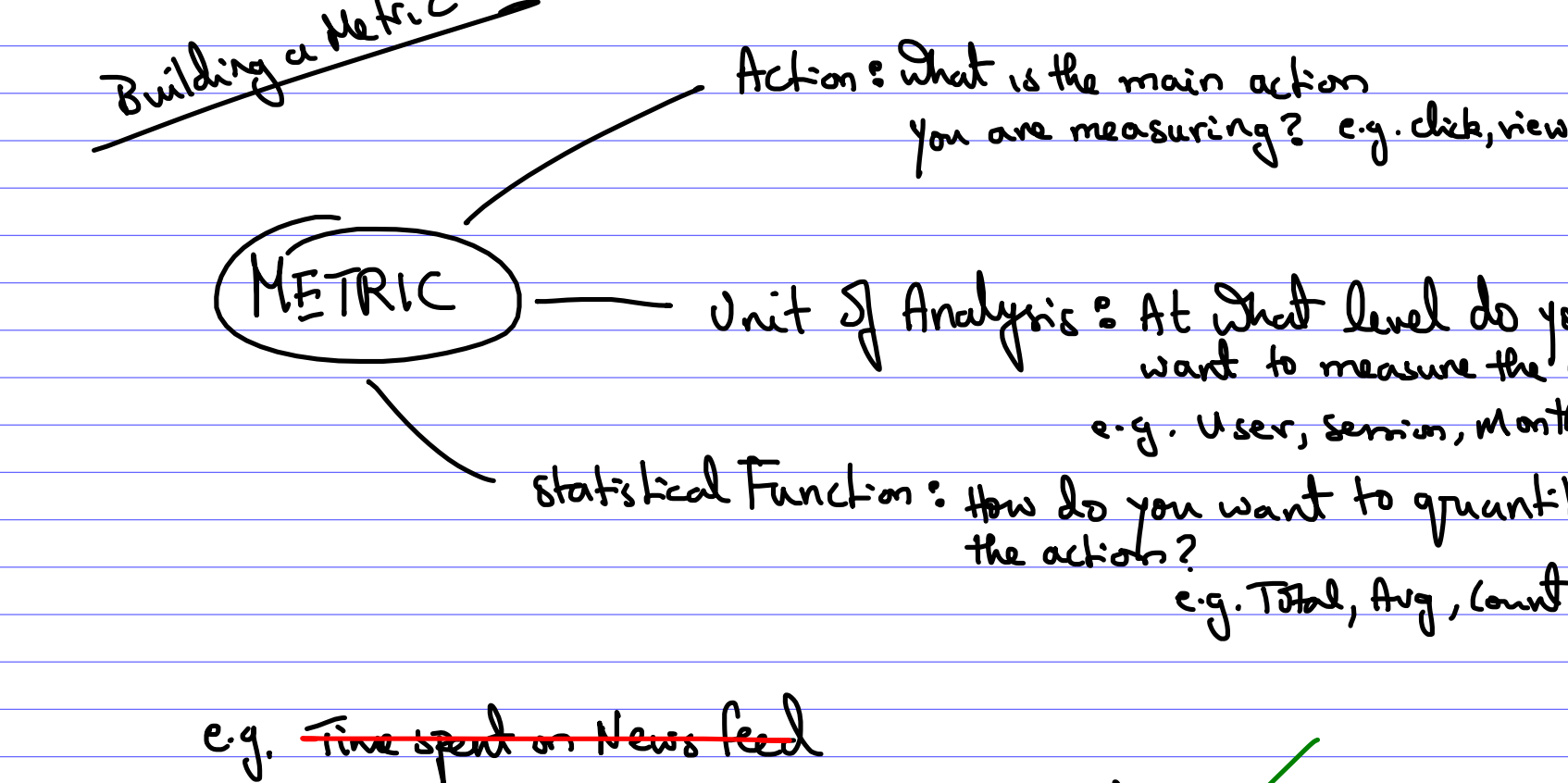
e.g.

- 1) Spotify : Time spent listening to music
- 2) Google : Search Volume
- 3) Facebook : Hours Consumed
- 4) Netflix : Hours Streamed

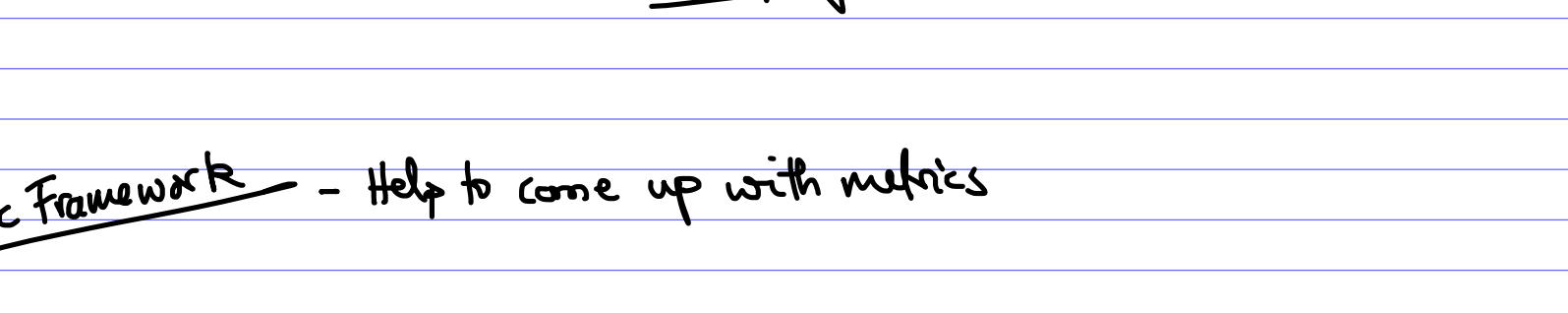
③ Driver & Secondary Metrics : What are the granular product- and feature-level metrics that correlate with NSM



e.g.



Building a Metric

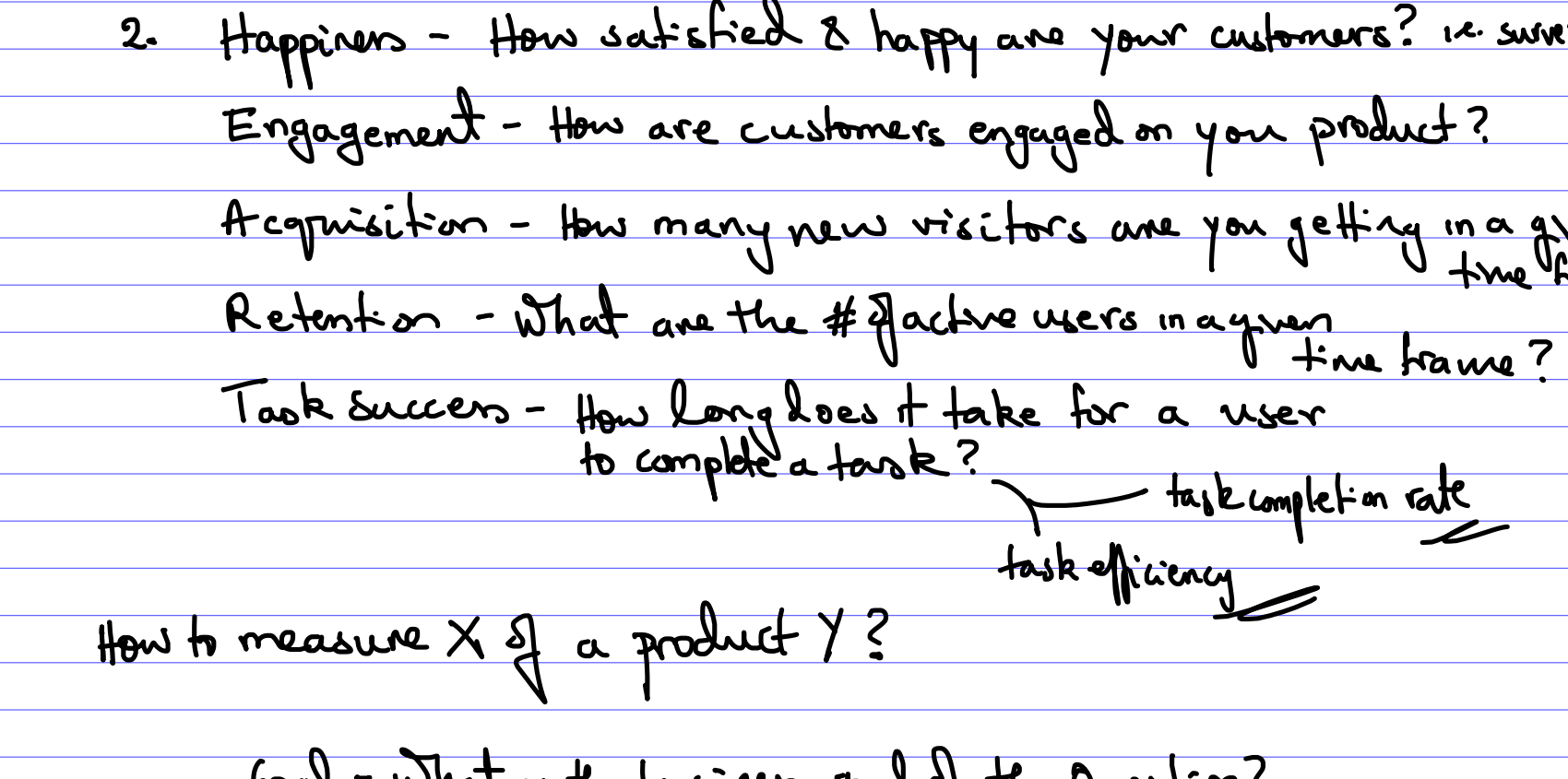


e.g. ~~Time spent on News Feed~~

Total time spent on News feed per Month ✓

~~per session~~

Metric Framework - Help to come up with metrics

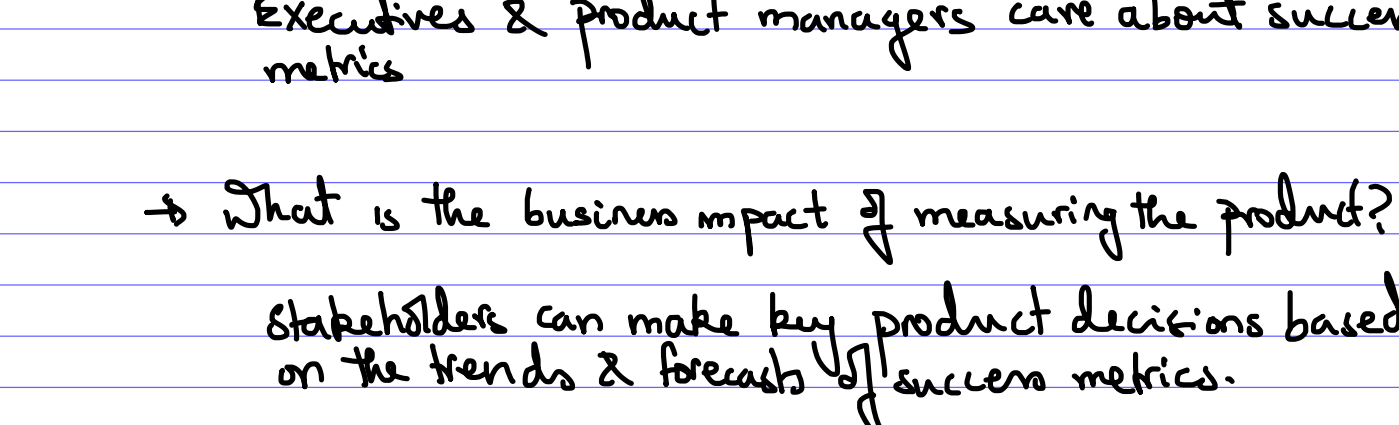


2. Happines - How satisfied & happy are your customers? i.e. survey score
Engagement - How are customers engaged on your product?
Acquisition - How many new visitors are you getting in a given time frame?
Retention - What are the # of active users in a given time frame?
Task Success - How long does it take for a user to complete a task? (task completion rate, task efficiency)

How to measure X of a product Y?

- Goal - What is the business goal of the direction?
- Action - What is the user journey of the product?
- Metric - How do you measure the product?
- Evaluate - How would you prioritize & evaluate the metrics?

e.g. How do you measure success on YouTube? → Two sided Market: consumer creators



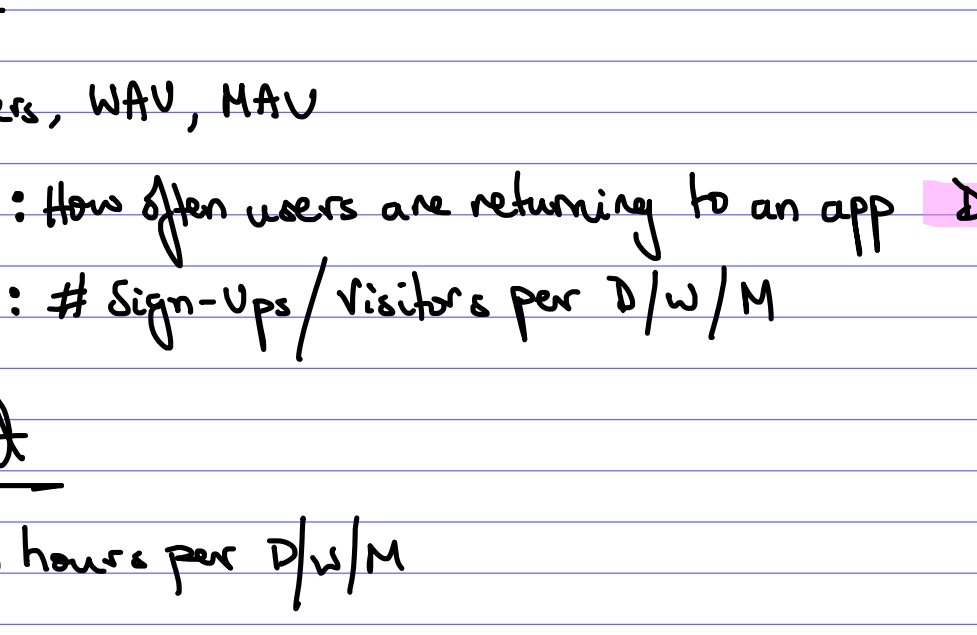
1. Goal

- What is the purpose of the product?
YouTube is a video platform that allows users to view & publish videos. The platform's mission is to "give everyone a voice & shows them the world."
- What does the term "success" mean? Breakdown into dimensions: Track growth, engagement, & monetization of YouTube. (Note: 'Revenue' is crossed out and 'monetization' is written below it.)
- Who is the key audience of the metrics?
Executives & product managers care about success metrics
- What is the business impact of measuring the product?
Stakeholders can make key product decisions based on the trends & forecasts of success metrics.

2. Action

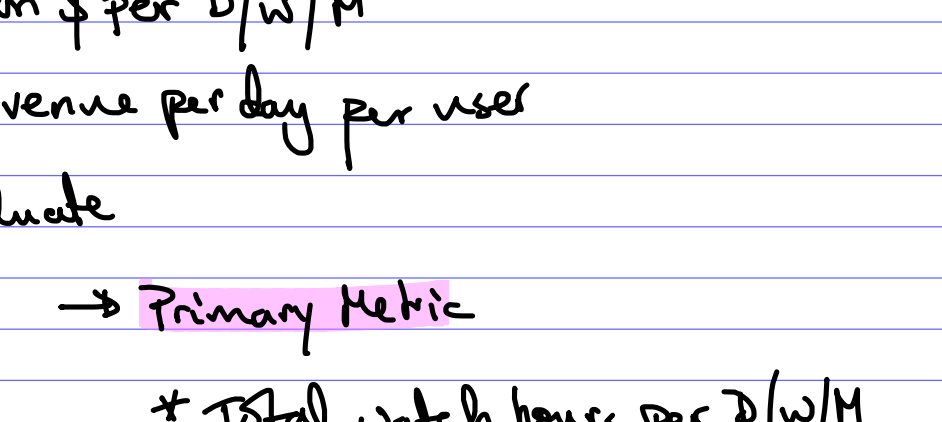
- What are the **concrete** actions a user takes to achieve a task?

~~Engage / usage~~ (Too Vague)
Sign-Ups, Clicks, Purchase ✓



3. Metrics

- Group metrics based on dimensions (varies depending on Question)



GROWTH

- Daily Active Users, MAU, MAU
- Stickiness Score: How often users are returning to an app **DAU/MAU**
- Sign-up Rate: # Sign-Ups / Visitors per D/W/M

Engagement

- Total watch hours per D/W/M
- Avg " " " " per user
- Total # of posts created per D/W/M
- Avg hours spent per day per user

Monetization

- Total Ad revenue per D/W/M
- Subscription \$ per D/W/M
- Avg Ad revenue per day per user

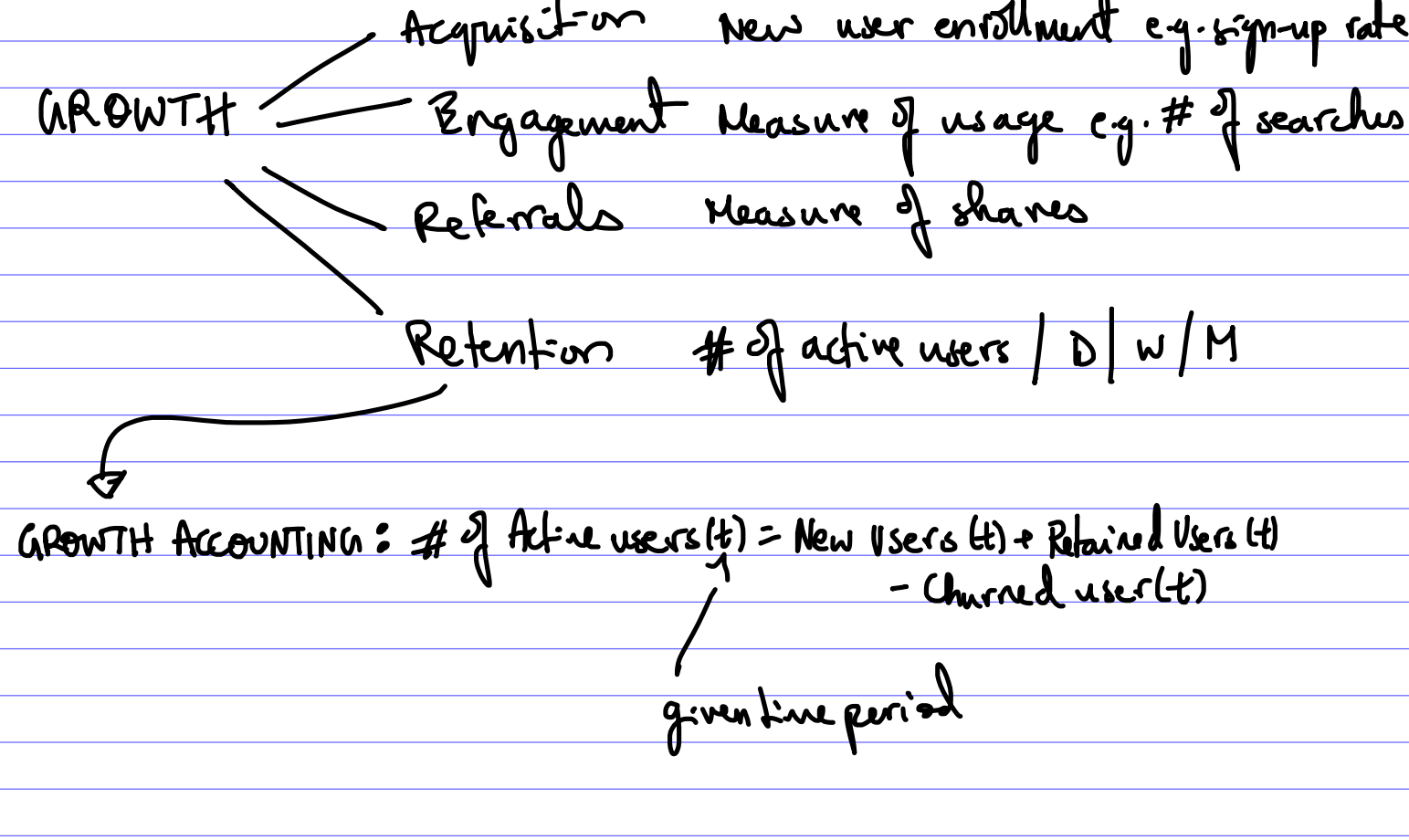
4. Evaluate

- **Primary Metric**
★ Total watch hours per D/W/M
- **Secondary Metrics**
★ DAU
★ Total # of posts created per D/W/M
★ Total Ad revenue generated per D/W/M

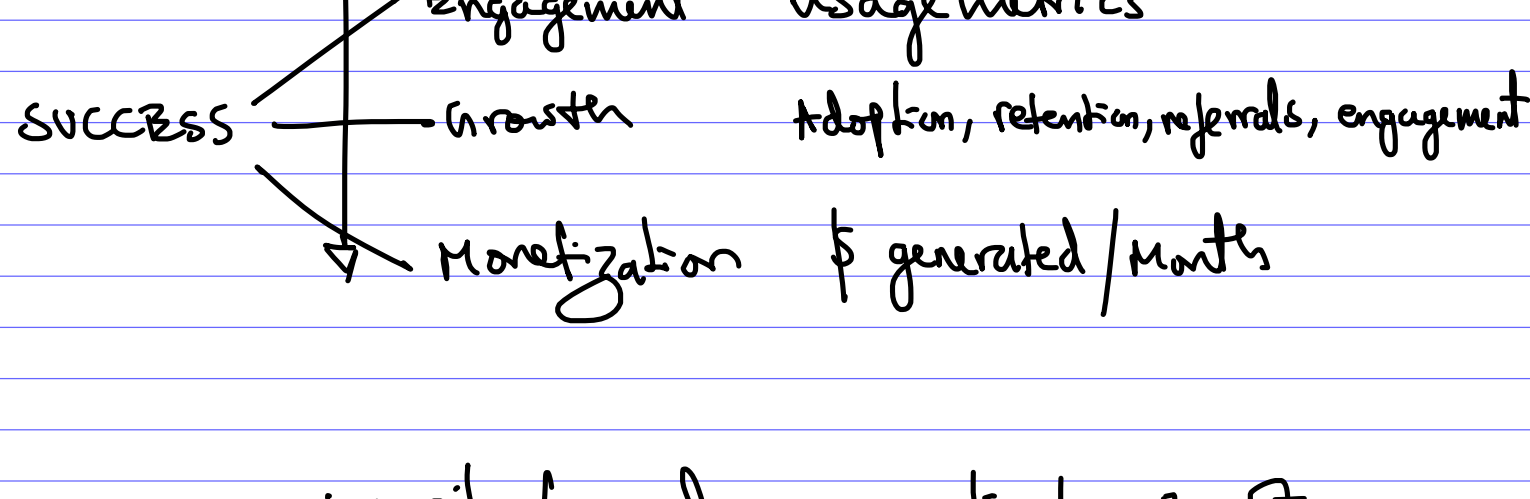
MEASURING PRODUCT QUALITY

How do you measure [quality] on [products]?

What is GROWTH? Measuring growth ensures that a product is increasing its active user size.



What is SUCCESS? A quality that embodies whether a product is on the right path towards the company's North star.



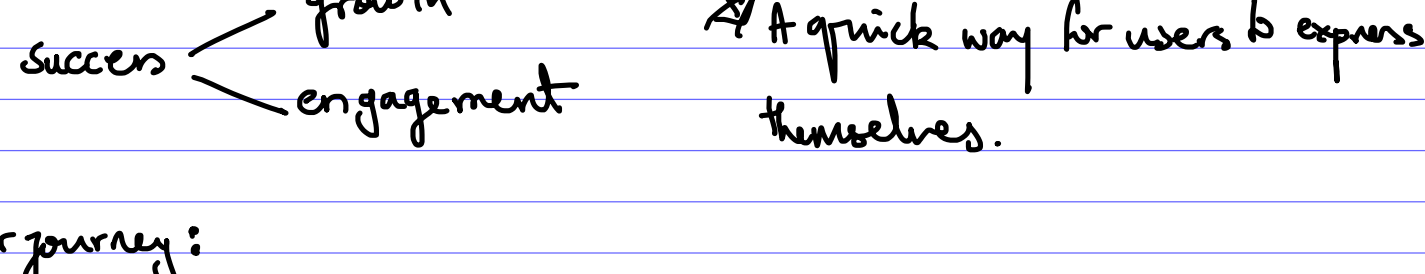
if company is primarily focused on monetization & not providing value to users, while this may work out in the short term, in the long time it may impact the engagement, growth & finally monetization.

e.g. Google deciding to populate the search engine with lots of Ads.

What is HEALTH? A 360-degree overview of a product's core functions. Use the HEART framework to measure the health of a product.

e.g. How would you evaluate the success of Reactions on Facebook?

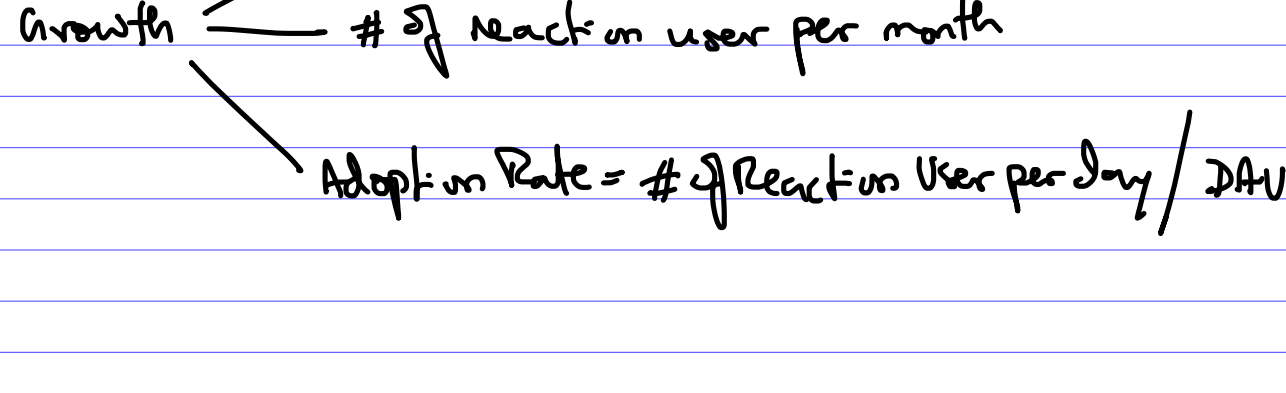
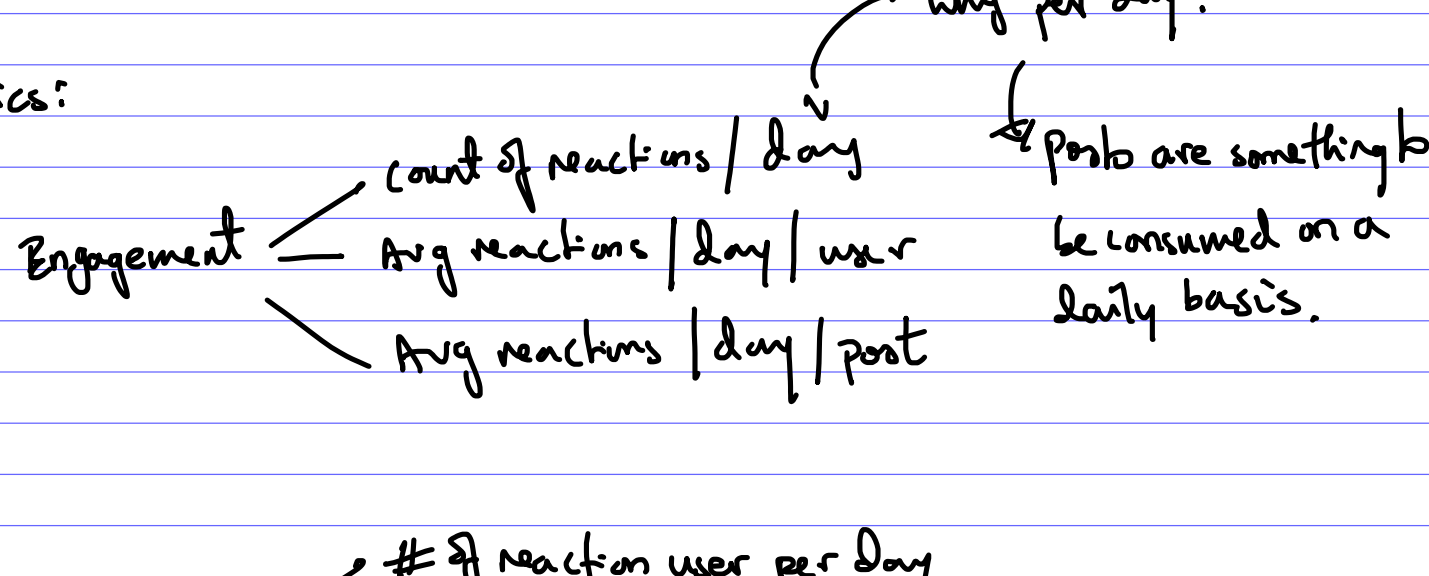
Goal: FB's reactions enables users to express emotions visually on Facebook posts.



User journey:

1. Read a post
 2. Click an emoji
 3. Display Reactions
- allows viewers to gauge the general sentiment

Metrics:



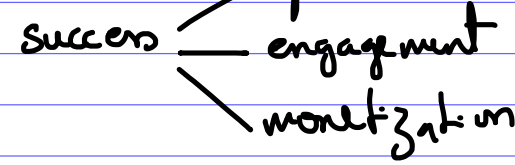
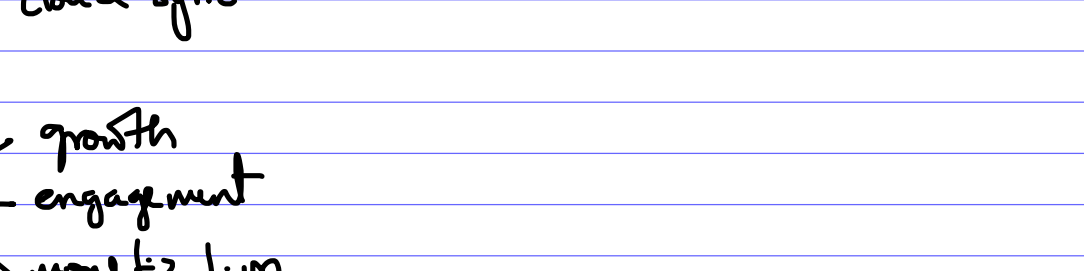
Evaluate:

Primary: # of Reaction User per day

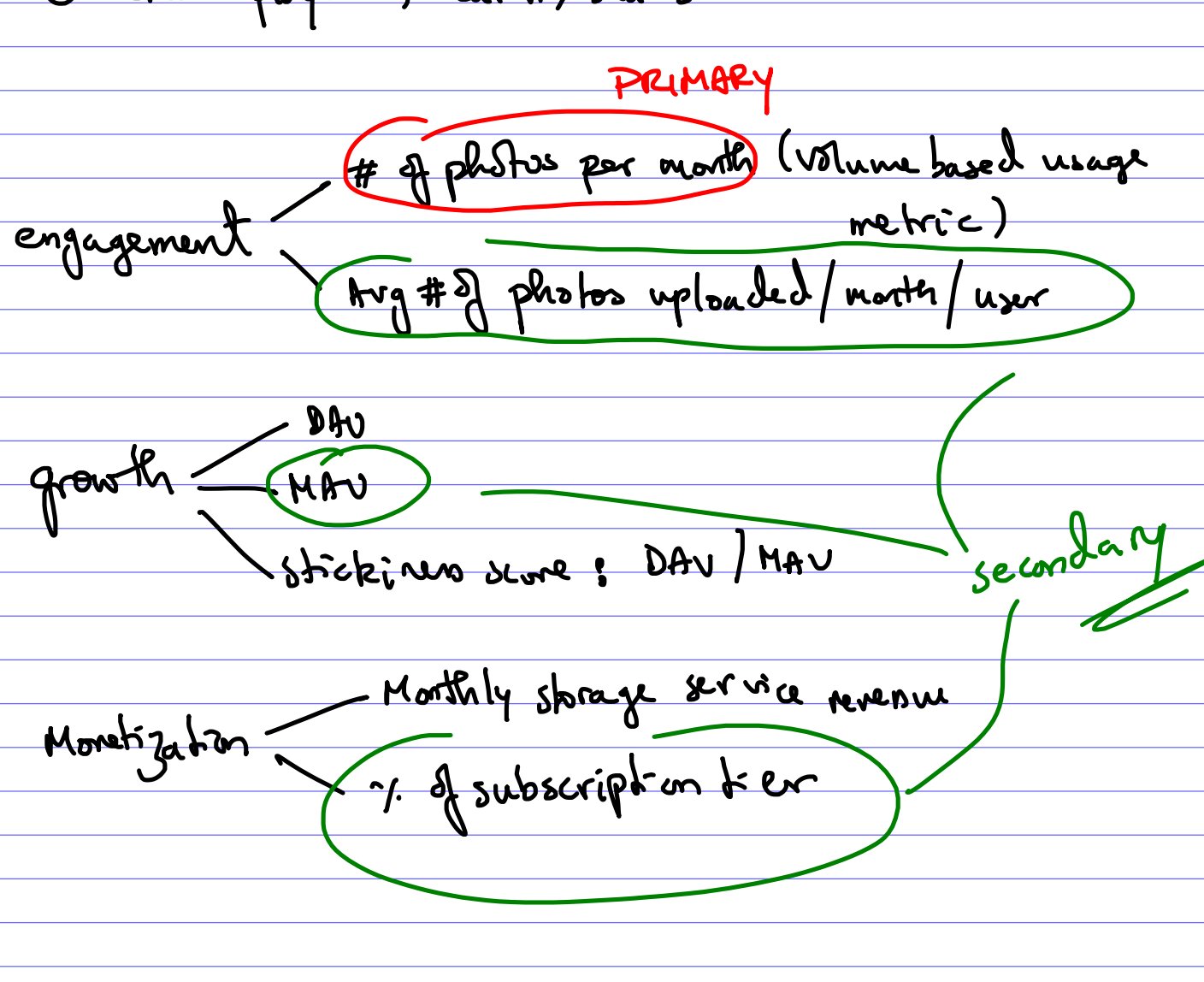
Secondary:

- count of reactions per day
- Avg reactions per day per user
- Avg reactions per day per post

e.g. How do you measure the success of google photos?

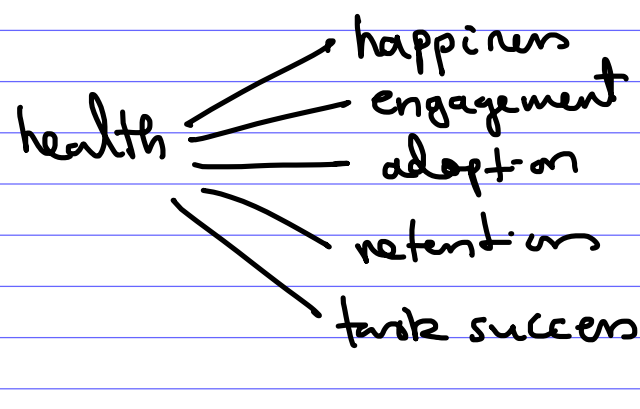


- 1 create a google account
- 2 upload photos & videos
- 3 create playlists, search, shares

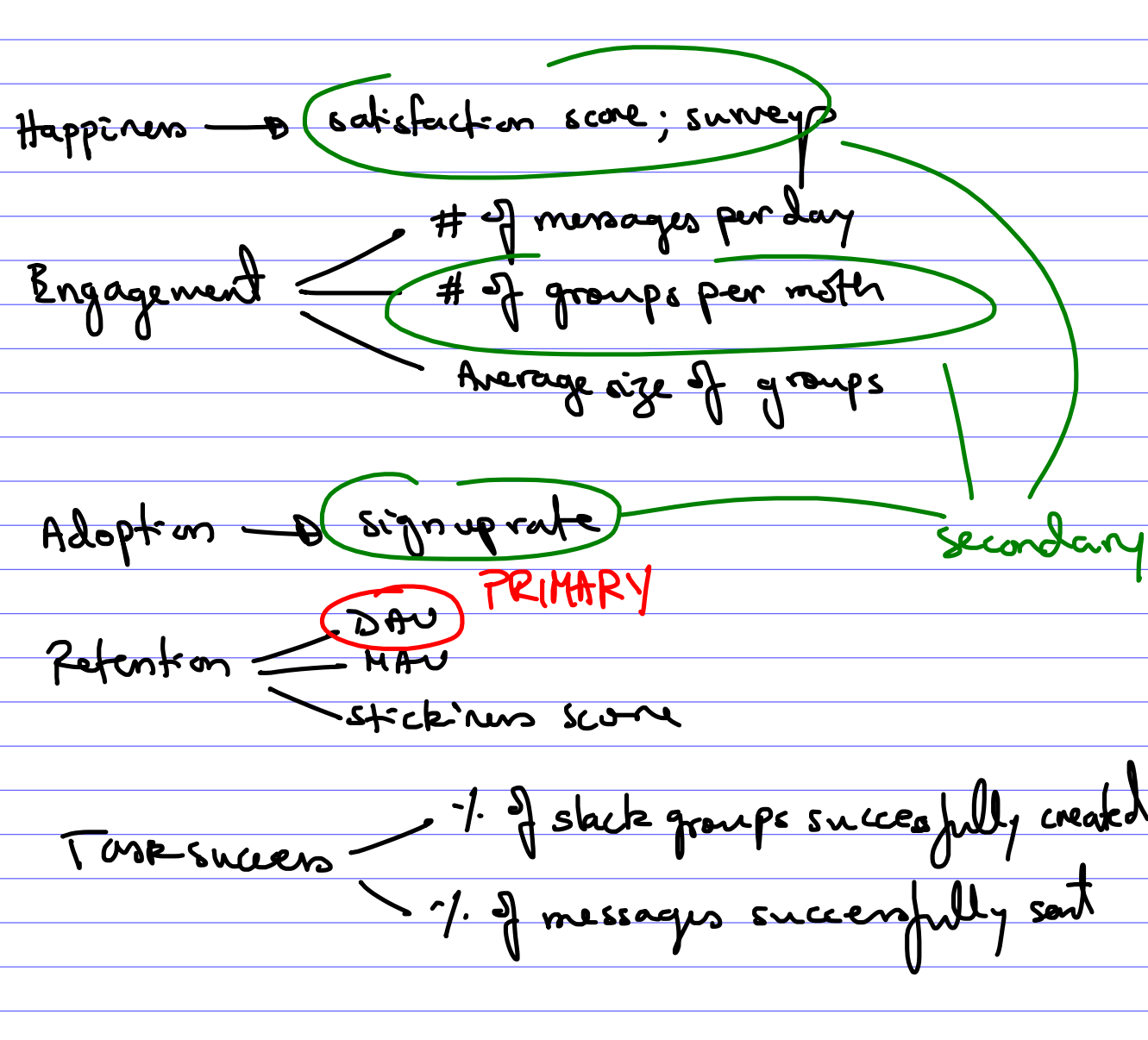


e.g. How do you measure the health of slack?

a communication app that allows members to communicate & collaborate on ideas.



- 1 sign up with an email account
- 2 post & read messages
- 3 create channels
- 4 search contents

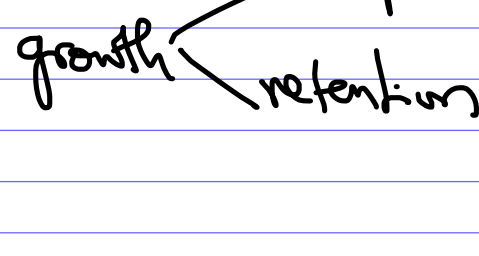


e.g. How do you measure growth of uber Eats.

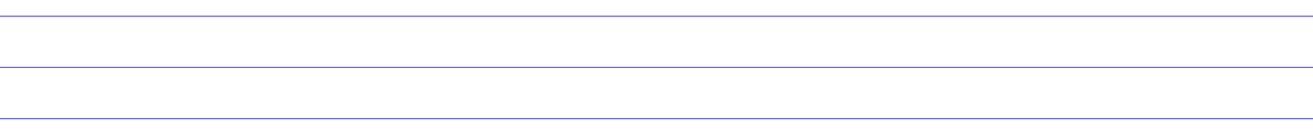
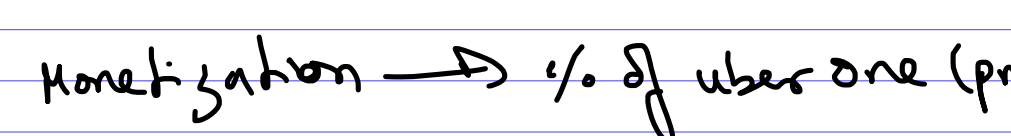
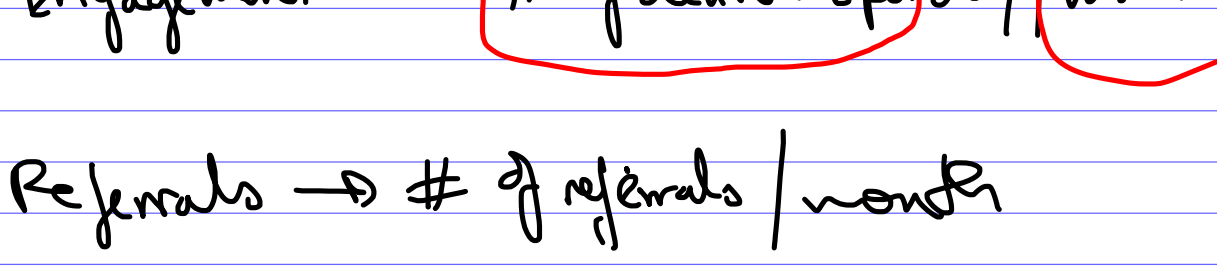
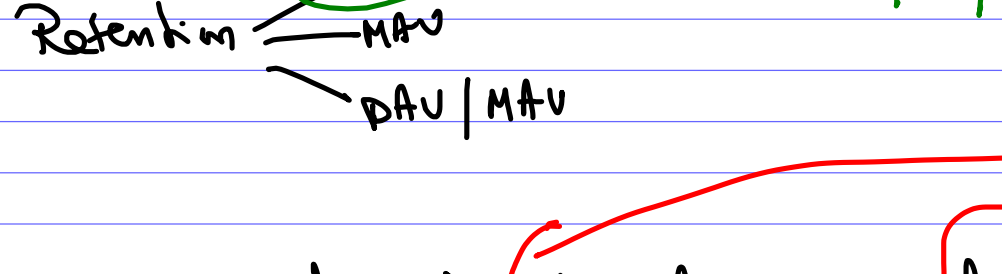
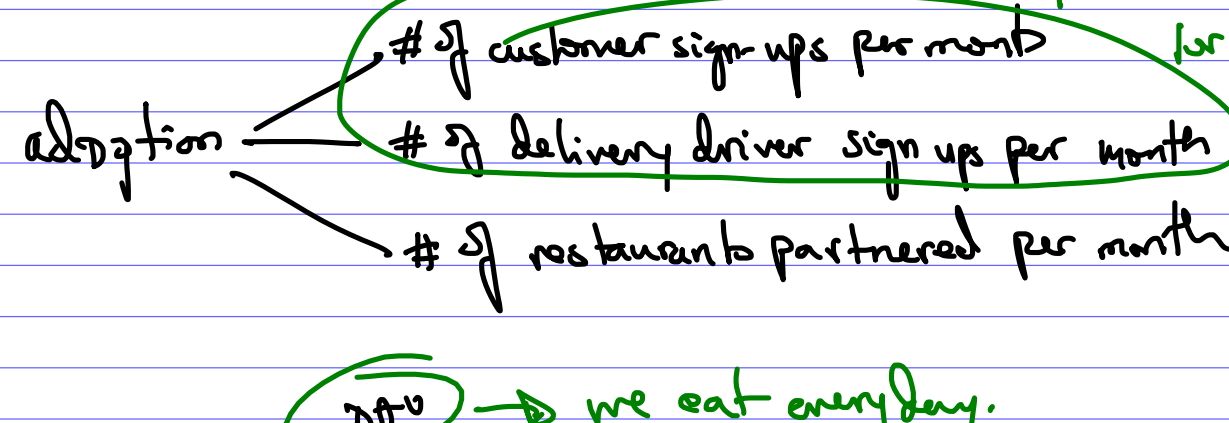
one of uber's flagship app that delivers restaurant meals to customers on-demand.

To help people get anything i.e. food, groceries etc. through the comfort of a phone and help people earn their way.

3 sided market: restaurants, delivery drivers, customers

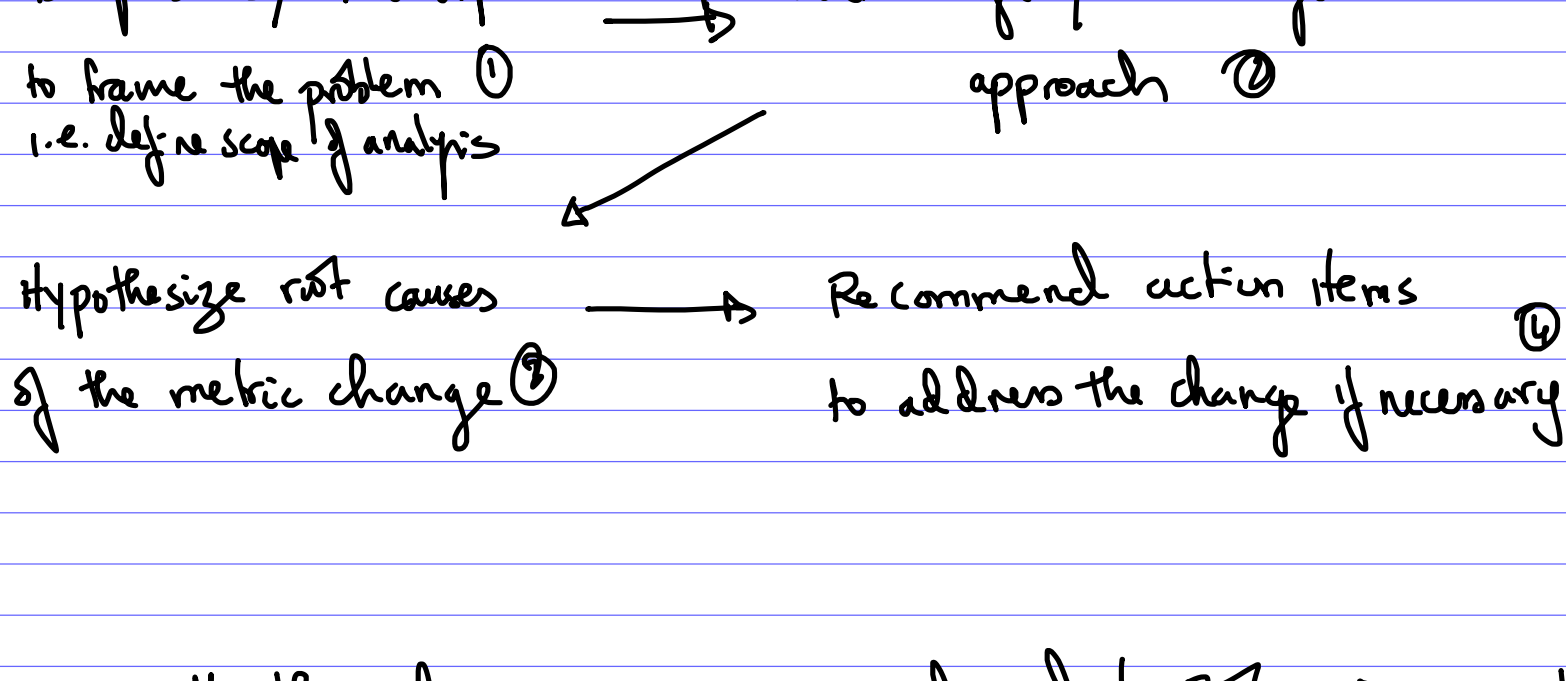


- 1 signup
- 2 browse restaurants + menus
- 3 order



METRIC INVESTIGATION

* A product case that involves investigating an unexpected change in key metrics



e.g. Monthly sales revenue on amazon dropped by 20% on December, how would you investigate this?

① sales revenue = $\sum (\text{price}(i) * \text{quantity}(i))$

↑ i-transaction

(looking at the building blocks of a metric may give insights as to how the metric change has come.

* Amazon is a conglomerate of multiple businesses are we taking into consideration all the businesses or a specific part of Amazon?

* is the 20% drop based on the sales revenue compared to Dec last year or the previous month of same year?

② * Outline Research questions / procedure to identify root cause

* outline your approach to the investigation

* WE ARE NOT FINDING THE ROOT CAUSE BUT RATHER DEVISING AN APPROACH FOR ANALYSIS

* Time: is the drop sudden or gradual? is it seasonal?

* Funnel: Which step of the conversion procedure does the drop occur?

* Regional: is the change global or regional? looking at revenue share across countries & continents.

* Device: is the change seen across devices or some OS?

* Other features: is the change seen across the platform or specific products.

amazon.com

- Products & Brands
- Kindle
- Audio
- video

* Competition: is the decline happening to other companies?

terms: customer patterns, user experience factors

③

* is the drop following a seasonal trend?

* is there a broken feature, outage, or data pipeline issue? → faulty reporting

* Has there been a new product or feature released with bugs or change aversion?

* Are users losing interest?

* is advertising failing to reach a segment of users? → Amazon is well established

* is there a similar product that's diluting user engagement? i.e. cannibalism

look at key KPI's for old & new product

* Are users switching to competitors

* other external factors: media backlash, inflation, pandemic →

④

* wait longer to see if the trend continues to drop

* Notify the product &/or engineering manager to address the change.

* Address the problem by fixing the code.

* Rollback the feature.

* Develop a new marketing, funnel, &/or product strategy to increase user engagement & growth.

e.g. Facebook engagement declined by 10% this month. What do you do?

①

* Are we talking about Facebook core app or the ecosystem as a whole?

* engagement? total session time per day & per month?

↑ encapsulates the overall functionalities users display on FB.

* 10%? Compared to previous month? year on year?

is it gradual or sudden change?

②

* check the trend of previous years to evaluate seasonality.

* check page visits, ad clicks, DAU, MAU

* Metrics are correlated

* Assess by continental & country levels

* Assess by device types

* check engagement of core features within the app

e.g. groups, marketplace.

Also check other products within Meta's ecosystem.

* is the decline happening to competitors?

③

* 10% decline is too steep for seasonality to occur

* is there a broken feature, outage, or data pipeline issue? → faulty reporting

* A major bug in core feature such as News Feed, or potentially new layout on FB causing change aversion.

* Are users losing interest?

* is advertising failing to reach a segment of users? → Facebook is well established

* is there a similar product that's diluting user engagement? i.e. cannibalism

* Are users switching to competitors

* other external factors: media backlash, inflation, pandemic

↑ this would actually increase the engagement

④

* Notify & fix

↳ look at error logs

↳ look at timeline of major releases

e.g. Youtube comments are up by 5% but watch time is down by 3% this month. What do you do?

①

* comments & text replies to videos

* watchtime: time spent consuming videos [NSM]

↑ Gauge engagement.

* is the decline year on year or compared to previous month.

* given comments increased we expect watchtime to ↑ also?

②

* check the trend of previous years to evaluate seasonality

* check page visits, view count, ad clicks, DAU, MAU

* Assess by continental & country levels

* Assess by device types

* check engagement of core features

↳ shorts

↳ live

* is the decline happening to other competitors?

* the changes could be related or independent of each other.

③

* is the drop following a seasonal trend? Maybe as it's 2% →

* is there a broken feature, outage, or data pipeline issue? →

* A new UI/UX on YT video page is causing a behavioral change. → Maybe comments ↑ b/c of UI/UX

* Are users losing interest? → but watch time is not going to do with this maybe the ranking algo is not working properly

* is advertising failing to reach a segment of users?

* is there a similar product that's diluting user engagement? i.e. cannibalism

* Are users switching to competitors? →

* other external factors: media backlash, inflation, pandemic

④

* Notify & wait

* fix

* Rollback

* New marketing strategy

terms: macroeconomic indicators e.g. unemployment rate

terms: Ad fill rate - how often ads are successfully shown when they are requested by a website or app.

of overall impressions / potential opportunities

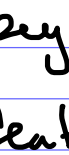
↑ Fractional metrics: we may want to address numerator vs denominator

PRODUCT IMPROVEMENT

- * discussion of data analysis, trade-offs & testing to determine what feature to build, whether to build it & how to test it.

① should you build/change a feature?

- ① Ask questions or make assumptions to frame the problem



- ② Explain the key steps on the current feature & new features proposed.



- ③ Discuss how you would conduct data analysis to gauge usage



- ④ Design an experiment to test the feature

e.g. should Tiktok raise the video length to 15 min?

- ① mobile platform that recommends catchy, short form videos.

↳ what is the current length?? Research prior

* Raising the video length could help Tiktok break into a new segment of audience seeking long-form videos as seen on YouTube & Podcasts.

This could promote growth, engagement & monetization

- ② user types: Who are the main user of the product?

↳ viewers & creators

Current vs New procedure? : step required to complete the task.

viewer: sign-up, sign-in, watch videos on the 'for you' page

creator: sign-up, sign-in, record video, publish video

③

Surveys: Have there been requests from users about this feature?

Proxy behavior: Are there suggestions indicating that the users want this feature/change?

↳ look at the distribution of video lengths consumed & published by age group.

④

→ AB experiment? [Research & Learn]

- controls vs treatment → spillover effect

- Cluster based randomization?

↳ Response Bias

- But people don't need to post a 15 min vid its optional

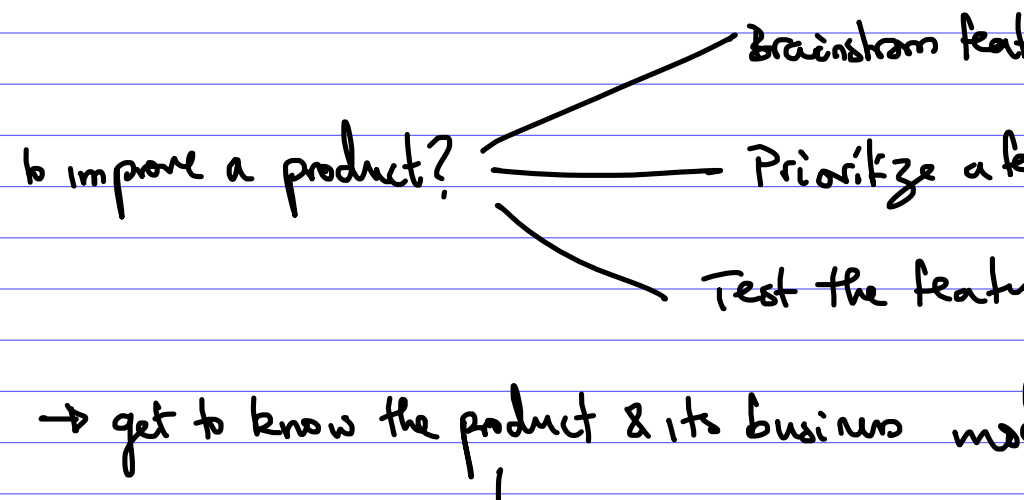
→ Causal inference - Regression Discontinuity.

[Research & Learn]

↳ look at both watch & video time to maybe segment by age.

⑤ How to prioritize a feature?

e.g. should you build feature X or feature Y.



⑥ How to improve a product?

- Brainstorm features
- Prioritize a feature
- Test the feature

→ get to know the product & its business model

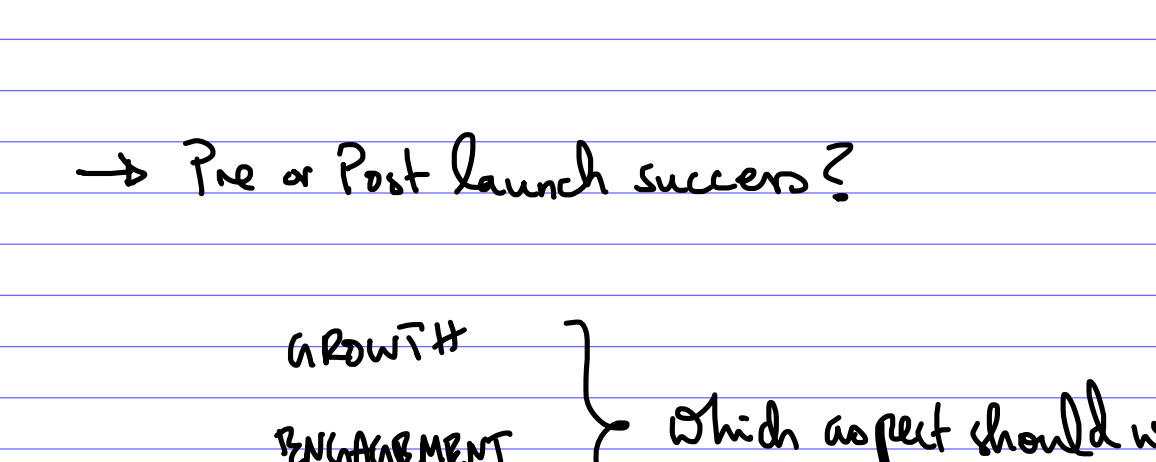
↳ UI/UX

→ Look to streamline tools.

→ is there a segment of users that the product has underserved?

→ better ways to monetize product?

* purchasing search space, monetization strategy



Terms: Bounce ratio, Mean Average Precision

→ Pre or Post launch success?

growth } Which aspect should we focus more on?
engagement
monetization

Any negative effects with introducing a new feature?

What metrics do we expect to increase &

" " " " " " Not decrease? (guardrail metric)

* What is the product/feature?

* What is the company's mission & how does the product relate to that?

* How does the product/feature work

* Who is the user base?

* Why does this product/feature exist?

* List all goals of the product & company

* What type of business is it?

* How does the product/feature help the business?

- ↑ users?
- ↳ Retention?
- ↳ usage?
- ↳ money?

Term: Simpson's paradox

* What can we measure that would quantitatively inform us that the feature is performing well?

* How do we go about measuring that?

* Think about product goal & which metric is the best indicator of this goal?