『**Marketing Science**』

Week 6 : Multi-Touch Digital Attribution

Jihong Gil

Index

Intro

정태영 ✔
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광고는 여전히 존재하는가? 존재한다. 그런데 그때 광고는 고체였고 지금 광고는 기체이다.

십년전까지는 광고를 제작하고 지상파 종편 신문 잡지에 매체 배분을 하여 기계적으로 집행하였다. 잘 만들고 충분한 예산을 쓰면 전달이 되고 효과가 나오는 딱딱한 고체였다. 지금은 어디로 어떻게 튈 지를 모르는 기체와 같아서 누구도 광고를 통제하지 못한다. TV채널인지 인스타인지 유튜브인지, 사진인지 숏폼인지, 나의 광고인지 남이 말해주는 평인지, 내용이 중요한지 조회수가 중요한지 너무나 복잡한 유체역학이다.

광고는 지난 십년간 완전히 다른 세상으로 움직였고 지금도 광속으로 바뀌고 있다. 그런데 아이러니한 점은 이런 변화에 가장 무딘 곳이 크리에이티브를 내세우는 광고회사들이다. 광고주의 입장에서는 이런 변화를 그나마 따라가는데 광고회사들은 이십년전에 세팅된 조직론/방법론/비지니스 모델(매체비용에 따른 수익 등등)이 오히려 변화 대응을 어렵게 하나보다.

Plan - Buy - Measure

Plan & Buy

- Objectives   KPI

  - Brand   : Reach, Ad Recall, Brand Awareness, ...

  - Performance

    - Traffic   : Volume, Cost Per Click, ...

    - Lead Generation   : Volume, Cost Per Lead, Lead Quality, ...
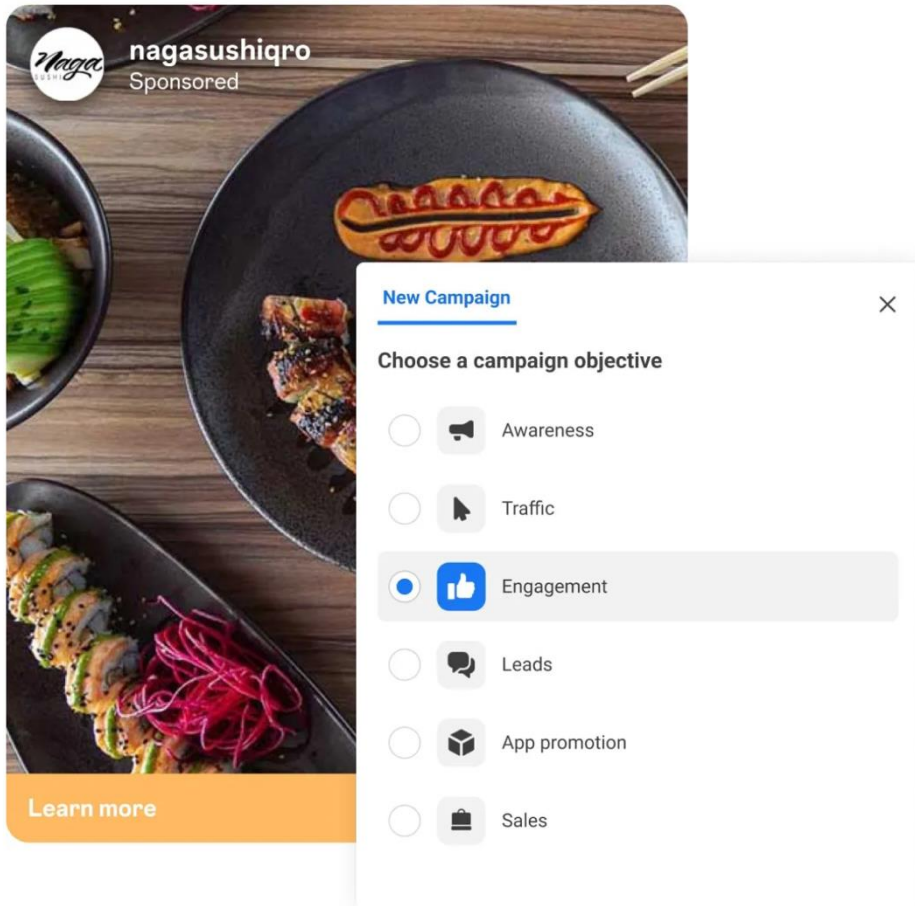
    - Install, Conversion   : Volume, Cost Per Action, LTV, ...

    - Sales   : Volume, ROAS, ...

Plan - Buy - Measure

Plan & Buy

Meta - Campaign Objectives

nagasushiqro
Sponsored

New Campaign
Choose a campaign objective
- Awareness
- Traffic
- Engagement
- Leads
- App promotion
- Sales

Learn more

Google Ads - Campaign Objectives

Objective	When to use it	Types of features
Sales	• Drive sales or conversions from customers who are ready to act • Engage with customers who've already contacted you or are very close to making a purchase decision	Features that start the purchasing or conversion process, such as visually striking ads, automated bidding and targeting, and other features that help you reach people who are actively browsing, researching, or comparing the products and services you sell
Leads	• Encourage relevant customers to express interest in your products or services by signing up for a newsletter or providing their contact information	Features that start the conversion process, such as automated bidding and targeting, visually striking ads, and other features that help you collect email addresses, newsletter signups, or other relevant contact information from people interested in your business
Website traffic	• Drive potential customers to visit your website	Features that help researching customers find potential product options, such as automated bidding, targeting, and ad creation, as well as features that can help you build a list of visitors you can later reconnect with
Awareness and consideration	• Increase awareness of your products or services. • Introduce customers to what you offer when releasing a new product or expanding your business into a new area.	Features that help you build brand recognition, such as compelling visual ads, bid strategies that drive views, and other features that help attract new customers and capture their attention

Plan – Buy – Measure

Plan & Buy

- Budget, Target Audience

- Period

- Reach & Frequency

- Message, Creative
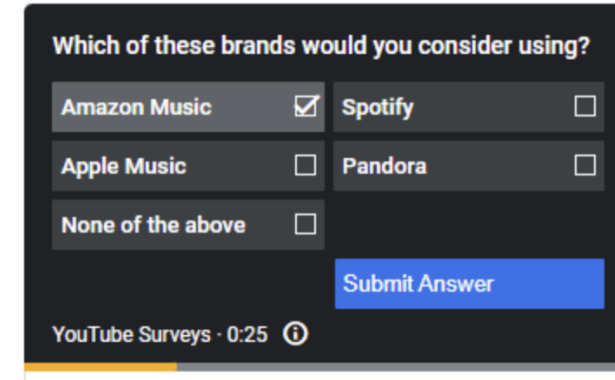
- Channel, Mix, …

- Bid: CPC, CPM, CPA, CPV, …

- …

Reach & frequency optimisation surface
(blue is budget constrained area,
total imp inventory: 1e+05/6*1000=16666667
nonlinear optm solution: 5669094 reach x 2.94 frequency)
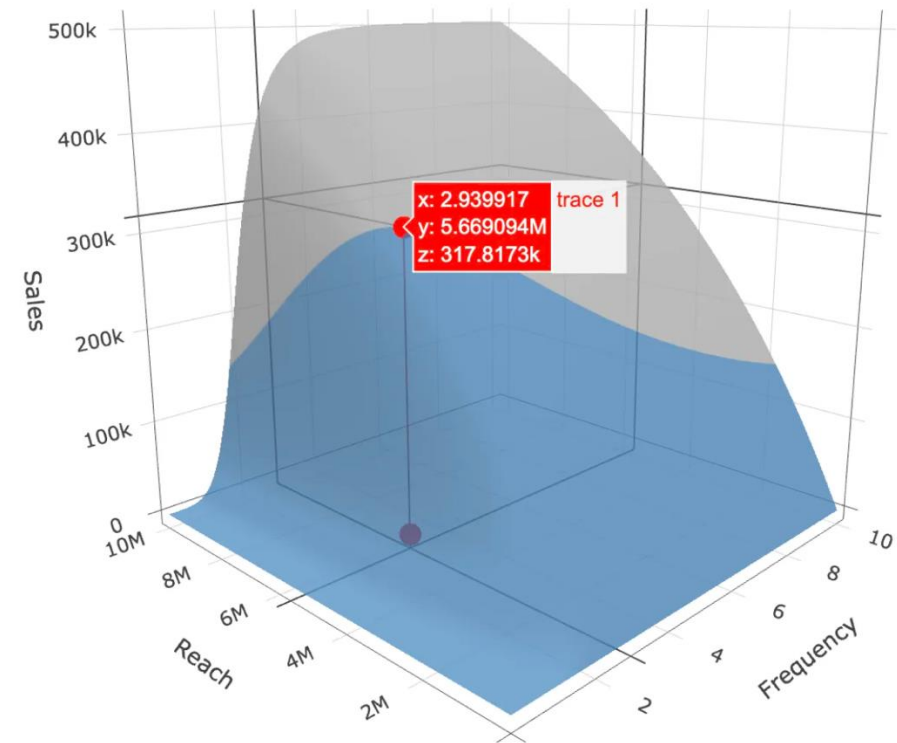
Meta Robyn - The reach & frequency allocator

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Plan - Buy - Measure

Measure

- Reach, Impression, Click, CPC, CTR, CPM

- Bounce Rate, Conversion Rate, Funnel Drop, …

- # of conversions

- AOV, Conversion Value, …

- CPI, CPA, ROAS, …

- Brand Lift Survey, …

- <u>Measurement should align with planned KPIs</u>

Multi Touch Attribution Model

Why multi touch attribution model?

Multi Touch Attribution Model
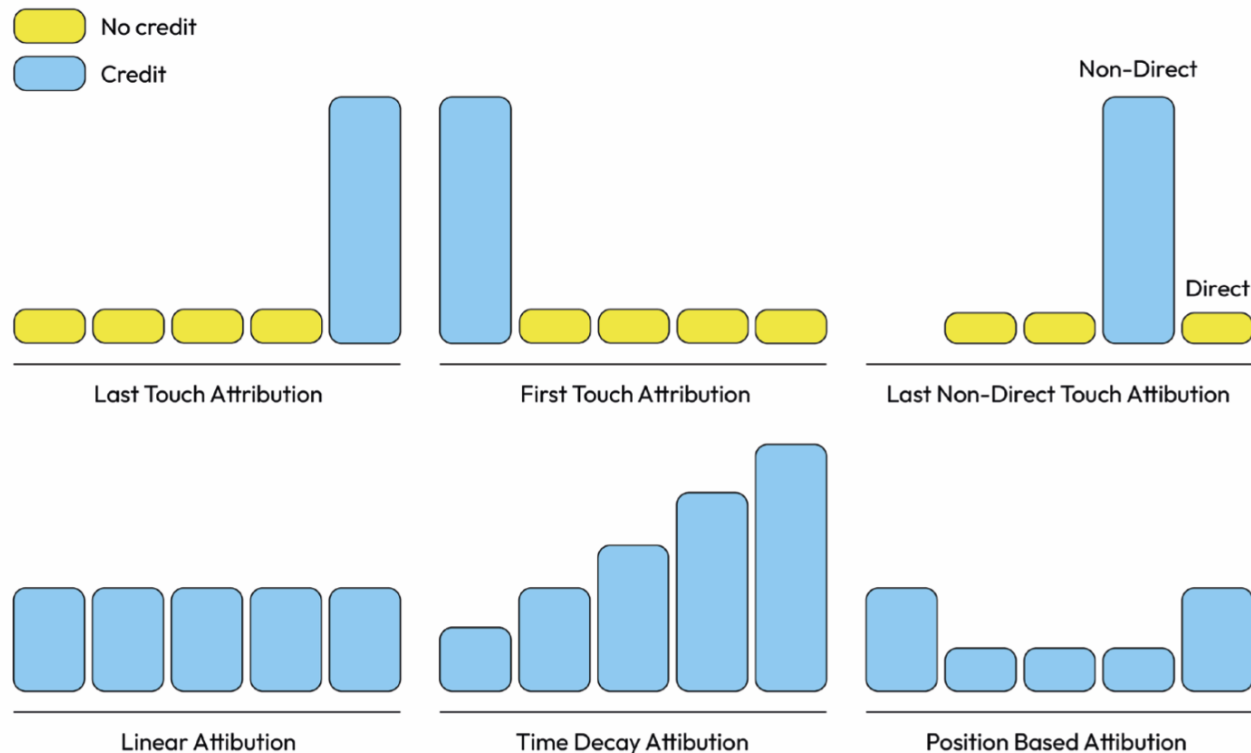
Heuristic Attribution Models

Figure 11.2 – Different heuristic attribution models

We now have a shorter DataFrame with only the columns we need in *Table 11.1*:

	user_id	date_served	date_subscribed	marketing_channel	converted
0	a100000029	2018-01-01	2018-01-01	House Ads	1
1	a100000030	2018-01-01	2018-01-01	House Ads	1
2	a100000031	2018-01-01	2018-01-01	House Ads	1
3	a100000032	2018-01-01	2018-01-01	House Ads	1
4	a100000033	2018-01-01	2018-01-01	House Ads	1

Table 11.1 – The first rows of the cleaned attribution data

```
last_touch_attr = data.groupby(['marketing_channel']
    ).agg({'converted': 'sum'})
last_touch_attr
```

marketing_channel	converted
Email	167
Facebook	237
House Ads	298
Instagram	265
Push	83

Table 11.2 – The last touch attribution model

Multi Touch Attribution Model

Algorithmic Attribution Models – Shapley Value Attribution

The formula to calculate the shapely value is as follows:

$$\phi_i(v) = \sum_{S \subseteq N \setminus \{i\}} \frac{|S|!\,(n - |S| - 1)!}{n!} (v(S \cup \{i\}) - v(S))$$

Let's review the key notations:

- N = Channels{*Display Ads, Facebook, Email, Google*} is a set of players. Note that instead of features, we take channels as the "players."

- i = a specific channel or player

- S = coalition, a subset of players that worked together to achieve a conversion

- $|S|$ = cardinality of S, the number of players in the coalition

- n = the number of channels or players in the game

- $v(S)$ = a real-valued function v that is a characteristic function that maps every coalition S to a value $v(S)$, the value of coalition S of channels. In our case, it is the weight of each channel after the calculation

- Weight = $|S|!(n - |S| - 1)!n!$

- Marginal contribution = $v(S \cup i) - v(S)$ – that is, the incremental weighted sum minus the coalition without v(S)

Conversions are credited to the channels by a process of permutating the customer journeys. In each permutation, a channel is given an estimate of how essential it is overall.

1. Efficiency: The entire value to the group is divided

This is sensible: let's say there are 3 channels that contributed to a sale. Then the percentage contribution for all 3 should add up to 100 percent.

2. Null Player: A player that adds no value to any group gets nothing

A channel that does not lead to more sales should get a value of 0. Again, this rule makes sense.

3. Symmetry: Players who add exactly the same value get the same shares

For example, if two salespeople worked together on a sale equally, it is sensible to split the commission.

4. Additivity: If two games "add up" to a single game, the values in each game add up to the single game

This is a bit more technical point because it involves drawing out game diagrams. But here's a rough analogy. Let's say you are buying a car. One game is buying the car, another game is financing, and a third game is all the add-ons. Or this can be treated as a single game of buying a financed car with add-ons. The value assigned in the single large game should be the summation of the values assigned in the individual games.

Now comes the kicker. There is only one division scheme that meets all four of the criteria: this is the Shapley value. (This is a remarkable result, and it is part of the reason Lloyd Shapley was recognized with the Nobel Prize.)

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Multi Touch Attribution Model

Algorithmic Attribution Models – Shapley Value Attribution

	marketing_channel_subset	converted
0	Email	110
1	Email,Facebook	11
2	Email,Facebook,House Ads	8
3	Email,Facebook,House Ads,Instagram	0
4	Email,House Ads	40
5	Email,House Ads,Instagram	3
6	Email,House Ads,Push	1
7	Email,Instagram	10
8	Email,Push	4
9	Facebook	103
10	Facebook,House Ads	72
11	Facebook,House Ads,Instagram	24
12	Facebook,House Ads,Push	4
13	Facebook,Instagram	62
14	Facebook,Push	22
15	House Ads	280
16	House Ads,Instagram	103
17	House Ads,Instagram,Push	12
18	House Ads,Push	46
19	Instagram	57
20	Instagram,Push	21
21	Push	22

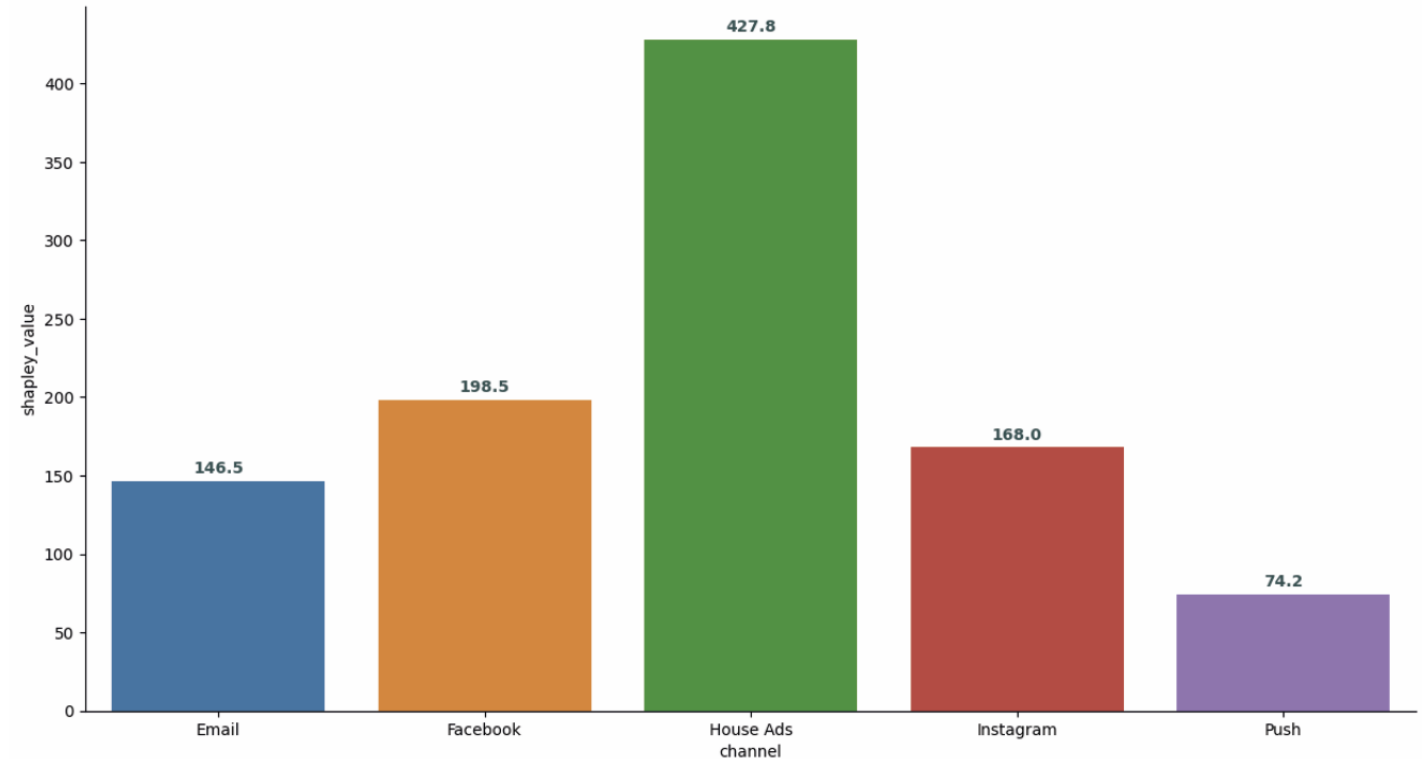Table 11.8 – Coalitions for Shapley value attribution

the Shapley Value of Email

Subset	Coalition	weight	Subset Contribution	Coalition's Contribution	Marginal Contribution	Shapley Value
Email	-	0.200	110	0	110	22.0
Email,Facebook	Facebook	0.050	224	103	121	6.1
Email,House Ads	House Ads	0.050	430	280	150	7.5
Email,Instagram	Instagram	0.050	177	57	120	6.0
Email,Push	Push	0.050	136	22	114	5.7
Email,Facebook,House Ads	Facebook,House Ads	0.033	624	455	169	5.6
Email,Facebook,Instagram	Facebook,Instagram	0.033	353	222	131	4.4
Email,Facebook,Push	Facebook,Push	0.033	272	147	125	4.2
Email,House Ads,Instagram	House Ads,Instagram	0.033	603	440	163	5.4
Email,House Ads,Push	House Ads,Push	0.033	503	348	155	5.2
Email,Instagram,Push	Instagram,Push	0.033	224	100	124	4.1
Email,Facebook,House Ads,Instagram	Facebook,House Ads,Instagram	0.050	883	701	182	9.1
Email,Facebook,House Ads,Push	Facebook,House Ads,Push	0.050	723	549	174	8.7
Email,Facebook,Instagram,Push	Facebook,Instagram,Push	0.050	422	287	135	6.8
Email,House Ads,Instagram,Push	House Ads,Instagram,Push	0.050	709	541	168	8.4
Email,Facebook,House Ads,Instagram,Push	Facebook,House Ads,Instagram,Push	0.200	1015	828	187	37.4
						146.5

Algorithmic Attribution Models - Shapley Value Attribution

	marketing_channel_subset	converted
0	Email	110
1	Email,Facebook	11
2	Email,Facebook,House Ads	8
3	Email,Facebook,House Ads,Instagram	0
4	Email,House Ads	40
5	Email,House Ads,Instagram	3
6	Email,House Ads,Push	1
7	Email,Instagram	10
8	Email,Push	4
9	Facebook	103
10	Facebook,House Ads	72
11	Facebook,House Ads,Instagram	24
12	Facebook,House Ads,Push	4
13	Facebook,Instagram	62
14	Facebook,Push	22
15	House Ads	280
16	House Ads,Instagram	103
17	House Ads,Instagram,Push	12
18	House Ads,Push	46
19	Instagram	57
20	Instagram,Push	21
21	Push	22

Table 11.8 – Coalitions for Shapley value attribution

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Multi Touch Attribution Model

Algorithmic Attribution Models - Fractribution

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Multi Touch Attribution Model
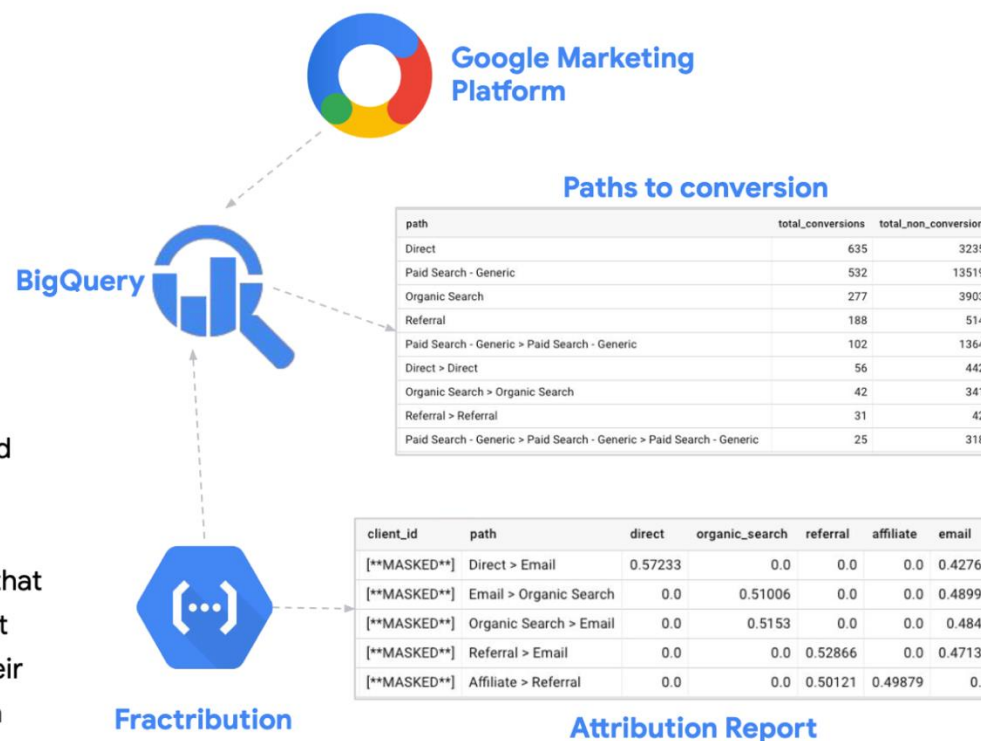
Dataset: Touch Points, Conversions, and User IDs

- Touch Point (e.g., click): publisher side data

- Conversion (e.g., install, register, purchase): advertiser side data

- User ID

  : Cookie, 1st party ID, …

  : GAID, IDFA

  : hashed e-mail, zip code, IP Address, Phone Number, …

  : Click ID

  : Fingerprinting

Multi Touch Attribution Model

Dataset: Touch Points, Conversions, and User IDs

How ID Graphs Work
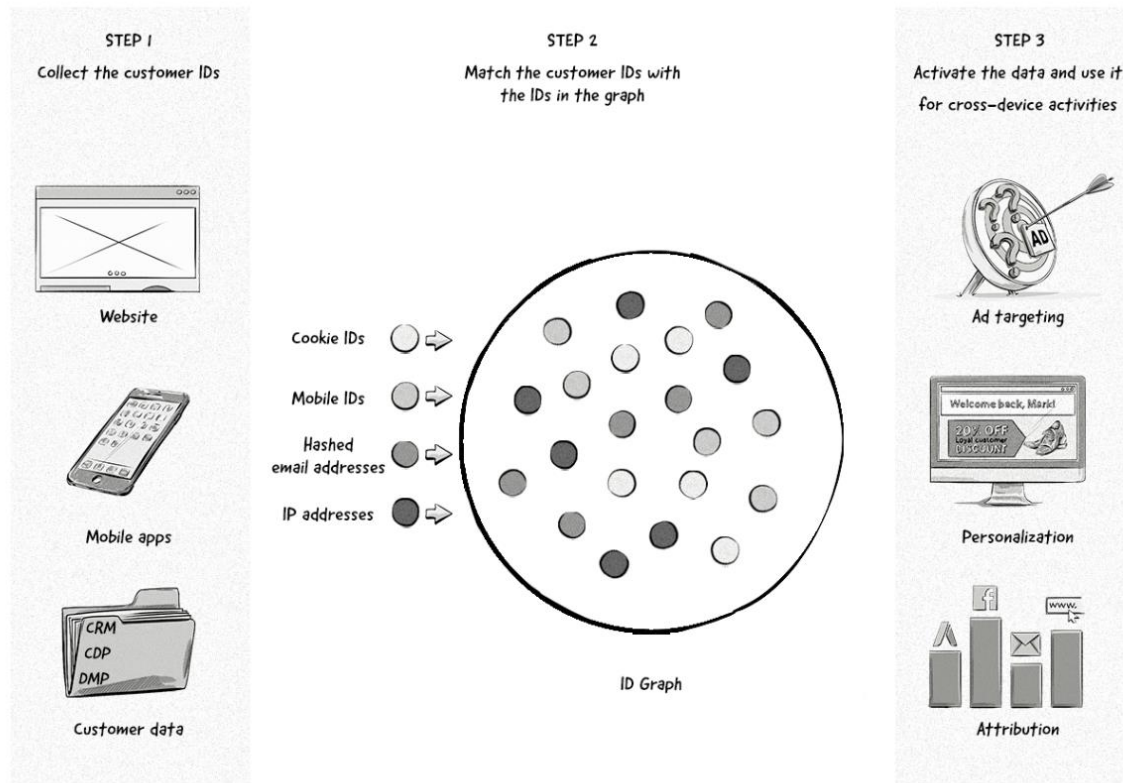
사용자 데이터	매개변수	형식	예
이메일	em	해시되지 않은 소문자 또는 해시된 SHA-256	jsmith@example.com 또는 6e3913852f512d76acff15d1e402c7502a5bbe6101745a7120a2a4833ebd2350
이름	fn	소문자	john
성	ln	소문자	smith
휴대폰	ph	국가 번호와 지역 번호를 포함한 숫자만	16505554444
외부 ID	external_id	광고주의 모든 고유한 ID입니다(예: 로열티 멤버십 ID, 사용자 ID, 외부 쿠키 ID).	a@example.com
성별	ge	소문자 1자, f 또는 m, 모르는 경우 빈칸으로 유지	f
생년월일	db	출생 연도, 월, 날짜를 포함한 숫자만	1991년 5월 26일의 경우 19910526.
시/군	ct	공백을 제거한 소문자	menlopark
주/도 또는 지역	st	소문자 2자리 주/도 또는 지역 코드	ca
우편번호	zp	문자열	94025
국가	country	소문자 2자리 국가 코드	us

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Challenge & Problem

Data Integrity

- Multi Devices * Multi Channels

- Tracking & Data Privacy

  : ATT opt-in rates: ~14% ([source: singular](#), 24.2Q)

  : Ad-blocking adoption: ~32% ([source: Statista](#))

Challenge & Problem

Click through? Gen Z don't click

TOP TRENDS 2025

| 5 | Gen Z don't click |

5. Gen Z don't click

This means focusing on clicks misses them

Why?

↑2.4x more likely to purchase without click after viewing an ad (18-24 vs. all ads).[1]

What?

Using click-based attribution means actively optimizing away from 18-24s.

So what?

1. Shift to incrementality measurement for 18-24s
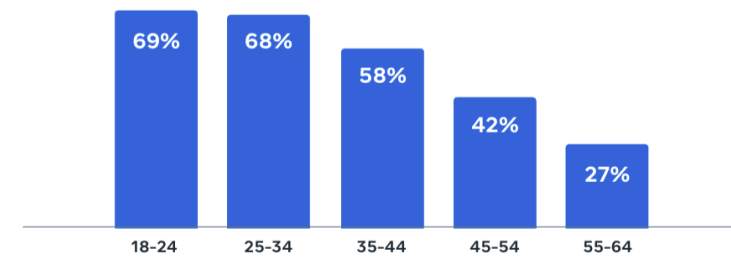2. Add view-based attribution window

18-24s click the least on Meta technologies[2]
Retail CTR by age group

18-24	25-34	35-44	45-54	55-64	65+
0.66%	0.99%	1.33%	1.62%	2.00%	2.29%
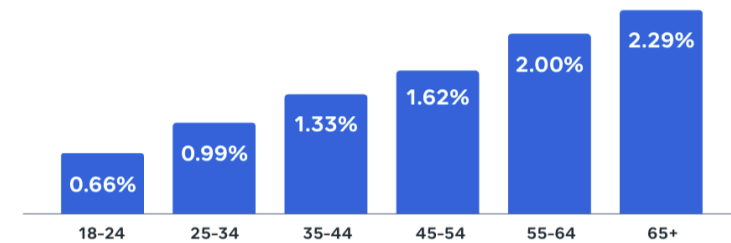
18-24s discover the most on Meta technologies[3]
% Discover new products using Meta technologies

18-24	25-34	35-44	45-54	55-64
69%	68%	58%	42%	27%

Challenge & Problem

TOFU < BOFU, Long Term < Short Term: Doom Loop
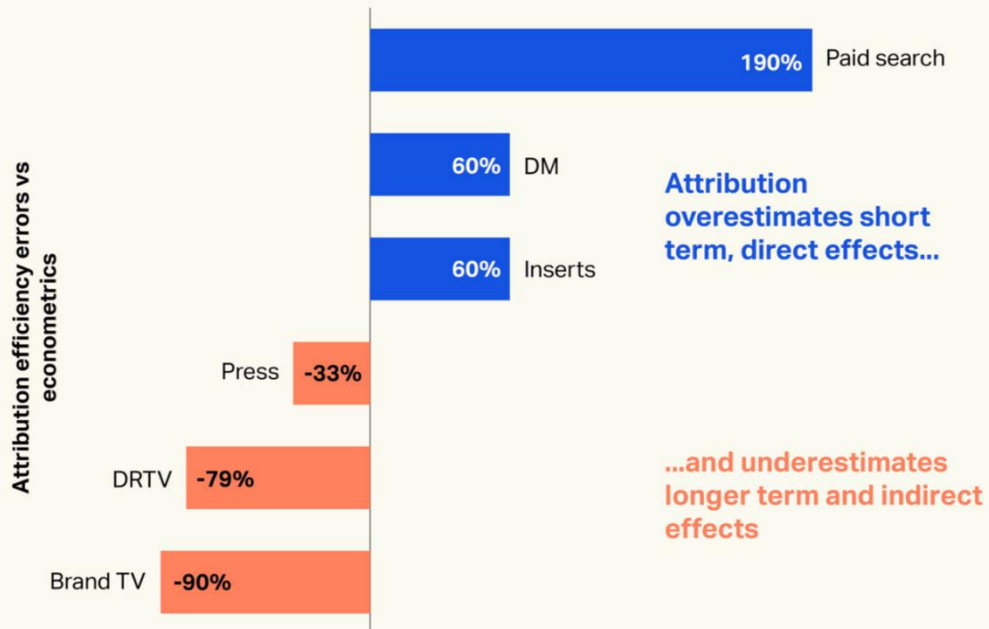

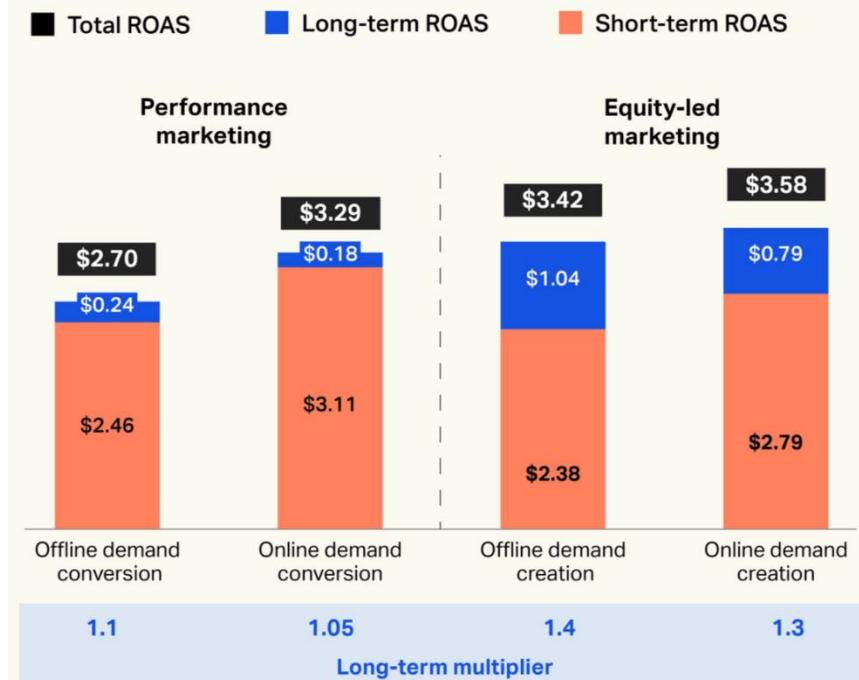### How bad is the attribution problem?

Last-click attribution can overestimate the impact of channels like paid search by as much as 190%

Attribution efficiency errors vs econometrics

Channel	Value
Paid search	190%
DM	60%
Inserts	60%
Press	-33%
DRTV	-79%
Brand TV	-90%

Attribution overestimates short term, direct effects...

...and underestimates longer term and indirect effects

Source: Analytic Partners

ROAS over time: brand vs. performance

■ Total ROAS ■ Long-term ROAS ■ Short-term ROAS

Performance marketing
- Offline demand conversion: Total $2.70, Long-term $0.24, Short-term $2.46
- Online demand conversion: Total $3.29, Long-term $0.18, Short-term $3.11

Equity-led marketing
- Offline demand creation: Total $3.42, Long-term $1.04, Short-term $2.38
- Online demand creation: Total $3.58, Long-term $0.79, Short-term $2.79

	Offline demand conversion	Online demand conversion	Offline demand creation	Online demand creation
Long-term multiplier	1.1	1.05	1.4	1.3

Long-term multiplier = Total ROAS ÷ Short-term ROAS

Source: BERA.ai

Challenge & Problem

Where do paid search sales come from?

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Triangulation of next-gen measurement

Directional decisions that drive growth

How next-gen measurement and attribution come together

Attribution

Know in the **short-term** how to optimize your campaigns down to the most granular level - creative, country, ad etc. across platforms from mobile to CTV.

Incrementality

Test new channels, campaigns and markets in the **mid-term** with always-on incrementality. Know the channels that are cannibal-izing organic vs campaigns driving paid lift.

MMM

Media Mix Modeling is a perfect pairing for **long-term** strategic planning. Forecast the best allocation of your budgets across all marketing efforts, not just those that can be attributed.

https://www.adjust.com/blog/attribution-incrementality-mmm/

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