The MMM handbook

A guide for developing impactful
marketing mix models (MMM)

Marketing mix models (MMM) help marketers compare different investments as they provide answers to questions such as:

- What drove my sales?
- What was my ROI?
- How do I optimise my marketing investment?

There is more to measurement strategies than the science behind the model. Incorporating business context to shape an MMM is an art — one with implications for the model's outcomes and financial recommendations. Advertisers who embrace that art can empower their businesses to make more strategic measurement-based decisions.

The checklist below summarises key MMM best practises to ensure rigorous model design.

Click on each section to explore related checklists:

1. Start with the right questions
2. Measure the impact on the right KPIs
3. Aim to capture everything
4. The insight is in the details
5. Use best practices for capturing media in MMM
6. What to ask for from an MMM partner
7. Taking MMM to the next level

How to use this guide:

If you are **considering an MMM for your organisation for the first time**, refer to this checklist when discussing methodology with potential partners and internal marketing science or data science teams. **Check off all best practices that you consider important for your business.**

If you **have already started your MMM journey, check off all best practices already included in your models** and consider discussing the remaining ones with your MMM team and partners.
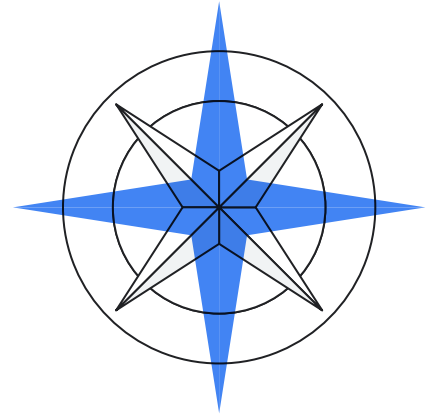
1 Start with the right questions

While it can be tempting to start the conversation about MMM with methodology, it is more beneficial to begin with business questions and then choose the best approach to answer them. MMM may not be able to answer all your questions, so identifying the limitations of your planned MMM solution will help you manage expectations and find complementary solutions.
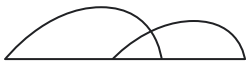
Is your MMM designed to answer the following questions?

Mark your answers with a ✓

Basic:

Yes No Unsure

What percentage of total sales is driven by each marketing channel?

How does the sales contribution from each channel compare to its share of investment?

How do non-media factors contribute to sales?

What percentage of sales would be lost if all media investments were cancelled?

Does digital media drive offline sales?

What is the historic ROI for each media channel?

What is the marginal ROI for each media channel?

What is the recommended budget allocation for each channel?

Advanced:

Yes No Unsure

Which tactics (creative, targeting, ad formats) contribute most to my media profitability?

What are the direct and indirect effects of media channels?

How does my media drive both short and long-term sales?

How do media channels compare in their ability to drive sales and brand outcomes?

How do I balance my media mix to drive both short and long-term sales?

What are the synergies between media channels?

Thought starter: Do you plan to use an MMM in order to answer a question that is not listed above? If so, which one?

2 Measure the impact on the right KPIs

Accurate marketing mix models recognise that different media campaigns drive different outcomes. While some campaigns drive brand perceptions, others generate leads or drive sales online or offline. Today, it is not uncommon to see MMM built around several KPIs via a model design called structural equation modelling, also known as nested models.

Nested models measure the impact on more than one KPI. For example, if brand-building campaigns are designed to drive brand preference, a brand preference index from a brand tracker would be the ideal outcome to measure in the model alongside sales. Sometimes continuous data for brand index is not available. In this case, proxies can be used such as Share of Search.
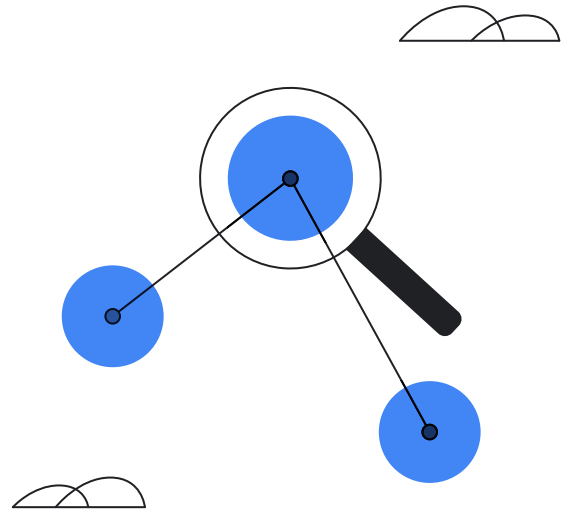
Which of the following KPIs are (planned to be) included in your MMM?

Mark your answers with a ✓

Yes No Unsure

Online sales

Offline sales

Total sales

Online action (leads, subscriptions, contracts, orders, etc.)

Offline actions

Total actions

Yes No Unsure

Visit to site

Share of Search

Google query volume

Purchase intent

Brand consideration

Brand preference/liking

Brand awareness

Thought starter: Does your model capture any other KPIs/outcomes? If so, which ones?

3 Aim to capture everything

A distinctive strength of MMM over other media effectiveness measurement solutions is the flexibility of model design and its ability to include outcomes and drivers that are relevant to the business while measuring all these relationships in the same analysis. If there is uncertainty about whether sales are impacted by an event or specific factor, MMM can confirm the impact by testing the relationship between the outcomes and potential drivers and, when a relationship is confirmed, estimate the strength of this relationship. With that in mind, it is important to be diligent in designing a comprehensive model by including all possible outcome drivers.

Traditionally, an MMM aimed to capture the impact of marketing on bottomline outcomes only: sales, transactions, or subscriptions. As more brands embraced full-funnel marketing, it became important to measure campaigns based on the job they were created for and to recognise that not all campaigns are designed to drive sales. Some marketing activity is reserved for building brand strength.

Luckily, brand measurement has existed for some time, with an ecosystem of brand tracking providers offering customer surveys that measure the share of the audience that is aware of the brand (brand awareness), has a positive mindset around it (preference) and intends to buy it (consideration or purchase intent). Modern MMM increasingly focus on the multi-functionality of media, measure impact on outcomes across the customer journey, and can even link media, brand strength and sales.

> Which factors do you (plan to) include in your MMM?

Mark your answers with a ✓

Yes No Unsure

- Media support by channel
- Price changes
- Distribution, if applicable (e.g. number of stores)
- External events (e.g. COVID-19)
- Economic factors, if applicable (gas prices, confidence index, other)
- Weather
- Seasonality

Yes No Unsure

- Competitive media
- Competitive price changes
- Product launches
- Other intermediate outcomes (Google query volume, share of Search, site traffic)
- Brand outcomes (brand awareness, consideration, preference)

Thought starter: Which additional drivers of sales does your MMM include or which factors do you plan to test?

4 The insight is in the details

You've probably heard the expression "garbage in, garbage out" — this is very true in MMM. While data has generally become more accurate and detailed thanks to new data collection and storing and management tools, it should not be taken for granted that data accuracy and granularity are the foundation of a robust MMM.

Receiving media data from trusted sources, such as the Google MMM data request tool, can help ensure data accuracy and completeness. It is a best practice to validate data by comparing a high-level summary (e.g. impressions or investment) with a similar summary from other sources, regardless of the method used to extract the data.

One of the most common criticisms of MMM is that the results it produces are not detailed enough. For example, channel-level ROIs can help make the right decision to balance budgets, but without campaign or tactic-level ROIs, marketers do not know what drives channel performance and how to improve the overall channel ROI. In contrast, channel performance by target, creative, or even optimisation method can help identify which tactics work better than others. The savviest marketers differentiate campaigns by their marketing objectives and measure their effectiveness on the relevant KPIs within an MMM.

While designing models for granularity, it is important to be aware of the risk of "over-fitting the model", which occurs when too many variables are included and the reliability of the model is sacrificed. One way to overcome this challenge is to rise the upper limit of the number of input variables by increasing the number of data points in the modeled KPI. he most common way of doing this is by segmenting all data by, for example, geographical areas or product segments, and stacking those segments in the modelled dataset.

Another obstacle to granularity can be the nature of media campaigns: multiple channels can be used simultaneously, leading to correlation of inputs. This compromises the accuracy of attribution of impacts on sales between correlated channels. Sometimes the only reliable way to measure such channels is to combine them in one input.
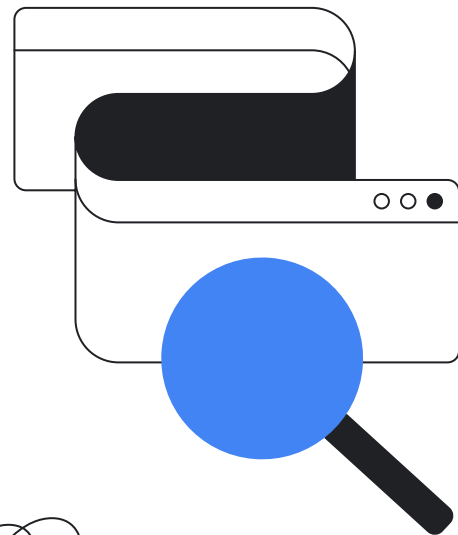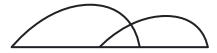
How comprehensive and accurate is your data?

Mark your answers with a ✓

Yes No Unsure

My media data...
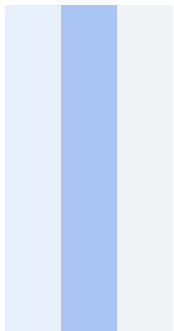
is extracted from trusted sources.

is validated by comparing totals or trends with a different source.

splits tactics by channel.

splits tactics by creative.

splits tactics by targeting.

splits tactics by marketing objectives.

"The savviest marketers differentiate campaigns by their marketing objectives and measure their effectiveness on the relevant KPIs within an MMM."

Thought starter: Which additional dimensions exist in your MMM media data?

5 Use best practices for capturing media in MMM

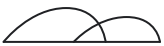MMM have been around for over five decades and this existence has resulted in a body of best practices that lean on proven relationships. It is most important that you **know what you are modelling** and understand how media works. Digital channels offer a greater variety of formats, targeting, and optimisation options than traditional channels.

"'Carryover' is a type of transformation from the original media input in order to better represent the staying power of ads."

Understanding the terminology

Seeing an ad today may result in a purchase decision a week from now. **Carryover** is a type of transformation from the original media input (e.g. impressions) in order to better represent the staying power of ads.

Since most media campaigns run over time, ranging from several days to weeks, the carry-over effect from each day of the campaign must be added to the immediate effects in the subsequent days. Media inputs need to be transformed to account for this effect. This is called the **adstock effect.**

As advertisers continue to increase investments in a media channel, the channel nears the point where it has influenced all the people it could. The closer the investment levels to this point, the lower the return is on investment. This is called **diminishing returns**. Media inputs need to be transformed to account for this effect.

The level of **granularity** has a big impact on the calculated ROIs from MMM. Generally speaking, more media inputs (e.g. by campaign, creative, bidding strategy, or target audience) produce more accurate results by providing a differentiated view of the performance for each of these tactics.

"The nested model approach can calculate the sum of the short and long-term sales ROI, where the impact via improving brand KPIs is measured."

One of the key considerations for measuring the ROI of upper-funnel or brand building channels is capturing total ROI, which is the sum of the short and long-term sales ROI. The latter can be calculated using a **nested model** approach, where the direct impact on sales and the **indirect impact via improving brand KPIs** are measured.

The types of inputs used to represent a channel also make a significant difference. For example, some studies show that branded search modelled with clicks instead of impressions show a significantly different ROI for branded search, while the difference is less noticeable for generic ads and shopping ads.

It is up to the modeller's discretion to use clicks or impressions as inputs in the model, but it is recommended to **avoid using costs as input variables**, as this can lead to misleading results. Costs can vary based on targeting, advertiser's, and competitors' bidding strategies, and can cause misrepresentation of ad effectiveness.

Changes in media strategy are common and frequent in digital media. Moreover, our account teams work relentlessly to help advertisers optimise their media. Therefore, it is important to recognise that media ROI is expected to change over time. As a result, it is recommended to use **campaign-level inputs** wherever possible or to distinguish between time periods when a channel-level variable must be used to detect the changes in media ROI over time.

Finally, no model is perfect. Each model will have its own set of **limitations** in capturing digital channels, such as:

- Collinearity: e.g. YouTube is flighted at exactly the same time as TV ads
- Low levels of spend may cause lack of a detectable ROI
- Lack of variation (common in always-on campaigns) may cause a lack of detectable ROI

It is important to take note of the model's limitations and keep them in mind when turning MMM results into insights and budget recommendations. Sometimes model limitations lead to supplementary analyses for a more conclusive result, or at least caution when acting on the model's insights.

Do you apply these best practices to digital channels in your MMM?

Mark your answers with a ✓

Yes No Unsure

Each media channel has its own differentiated carryover effect.

Each channel input has been transformed to account for adstock.

Each media channel has been transformed to account for diminishing returns.

We and our modelling partners understand digital media channels and how to identify which part of the customer journey they address based on creative, formats, targeting, and bidding or buying strategy.

Our models capture digital media channels' effectiveness at sub-channel level (by creative, targeting, or campaign).

Our digital media channels are captured with impressions, clicks, or views instead of cost.

Our models are designed to capture direct and indirect effects of media.

Media ROI is differentiated by time periods via cutting variables in intervals in the model or grouping campaigns by time period in ROI calculations.

Our modelling partners have explored and shared with us the model's limitations which are considered in forming recommendations.

Our model is based on additive multivariate regression.

Our model is based on multiplicative multivariate regression.

Our model is based on Bayesian approach.

Thought starter: Which additional best practices does your MMM include?

6 What to ask for from an MMM partner

Selecting the right MMM partner and building a high-impact collaboration requires the partner's insight into your company's unique needs. Partners differentiate by methodology, technology, and services. However, there are several aspects of MMM that are consistently appreciated by most advertisers.

Refer to the checklist below to compare deliverables and the service level you receive from your partner, and decide which of them are most important to your organisation. Keep in mind that with MMM, like any other sector, a greater service implies higher costs.

Do you receive the below outputs or services from your MMM partner?

Mark your answers with a ✓

Yes No Unsure

Historic ROIs (past return on investment).

Marginal ROIs (return on the next $1 invested).

Response curves (also known as saturation curves).

Hypotheses as to which factors influenced media ROIs.

Budget optimisation scenarios.

Recommended actions outside of the media budgets.

ROIs by channel.

ROIs by ad format.

ROIs by creative.

ROIs by targeting.

ROI by bidding strategy or buy model, e.g. CPM, CPV, CPA (if applicable).

Clear and informative charts and data visualisations.

Explanation of the model results and consultation.

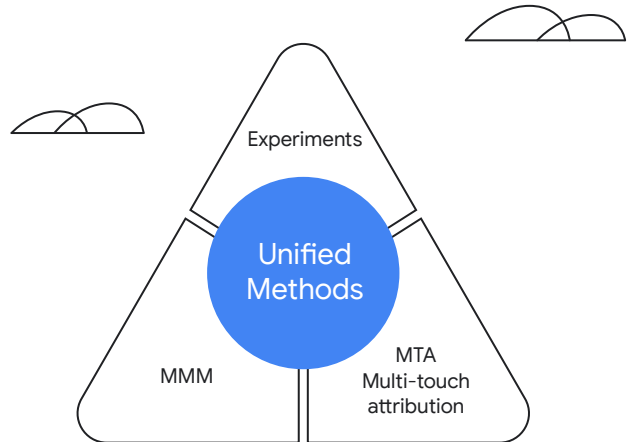**Thought starter:** Which additional outputs or services does your MMM partner provide?

7 Taking MMM to the next level

While marketing mix modelling has a high degree of versatility in what KPIs it can analyse and which factors can be included, it also has an important limitation — it cannot handle a high number of input variables which precludes deep granularity of results.

To meet this challenge, a blended methodology approach is leveraged by some advertisers, merging attribution and MMM to augment results with more granular media insights at a tactical level.

One common point of criticism of MMM is the fact that it is not causal in nature, but based on correlation. There are ways to test for causality within MMM but it can also be identified by combining MMM with other tactics, such as geo experiment or incrementality testing. Such approaches can also help calibrate the incremental volume from MMM.

Yet another way to take an MMM to the next level is to enrich the design or the insights with campaign-level measurements such as brand lift studies that measure changes in a brand KPI due to exposure to media on YouTube. This approach helps link improvements in brand KPIs to sales.
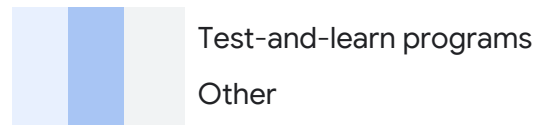
Experiments

Unified Methods

MMM

MTA Multi-touch attribution

Which analyses do you currently supplement your MMM with?

Mark your answers with a ✓

Yes No Unsure

Attribution

Experiments

Brand lift studies

Yes No Unsure

Test-and-learn programs

Other
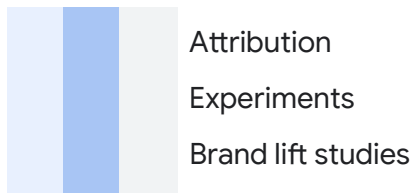
Thought starter: Which additional analyses are used to complement your MMM?