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# **A CMO's Guide to Marketing Mix Modeling**

## A CMO's Guide to Marketing Mix Modeling

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Initiatives: Marketing Data and Analytics

Marketing mix modeling is a crucial technique to improve media performance and quantify the impact of marketing, including brand investments. Successful CMOs rank their insight priorities and lean into scenario planning and model validation to improve program effectiveness.

### Overview

#### Key Findings

- CMOs are under pressure to prove the impact of marketing. However, an increasingly complex set of marketing activities to reach customers across more channels, devices and touchpoints — and a lack of complete data — lowers trust in their current performance metrics.
- Marketers still struggle to answer foundational questions about the impact of marketing on the business, such as, “How does paid digital media drive in-store sales?” or “How will a 10% change to upper-funnel media impact bookings?”
- The 2022 Gartner CMO Spend and Strategy Survey cited brand strategy and activation as one of the top three capabilities vital to adding the most unique value to marketing organizations’ strategies. Yet measuring the financial impact of brand initiatives is often tricky.
- Many marketers and analytics professionals with dated experience in mix modeling are skeptical of the technique or unaware of recent improvements. Faster turnaround times, greater depth of insights and more prescriptive recommendations are now available.

## Recommendations

CMOs looking to leverage marketing data and analytics to improve media performance should:

- Deliver insights on their most important measurement objectives by ranking insight priorities, developing a marketing mix modeling (MMM) roadmap and adjusting as necessary.
- Build trust in marketing mix models through a focused, well-designed testing protocol that validates predictions.
- Generate higher-performing marketing plans by scenario planning for multiple future possibilities using simulation and optimization tools.

## Introduction

### What Is Marketing Mix Modeling?

The goal of MMM is to determine the incremental impact associated with marketing activities and use those findings to answer strategic marketing questions. How impact is measured can vary; a focus on incremental revenue is common, but modeling multiple outcomes is a growing trend. The details of the modeling approach differ, but most forms use aggregate (not user-level) data. Therefore, MMM can consider a wide range of channels and external influences, including:

- Digital media, such as social media and banner ads
- Traditional media, such as broadcast television, out-of-home and radio
- Company factors that can impact conversions such as inventory levels, staffing or changes to geographic footprint
- Market forces, including relative price, competitive media spending and share of voice
- External factors, such as weather, seasonality or economic conditions (e.g., inflation, interest rates, consumer confidence)

Marketing mix modeling is a technique with a long history, and it continues to evolve. If you looked at marketing mix a decade ago and dismissed it due to “insights only at the channel level” or “results only updated quarterly,” you may benefit from revisiting the technique. While growing less common, media mix modeling is a simpler form of MMM that excludes external influences and focuses solely on paid advertising channels.

Marketing mix providers have worked to provide more granular, lower-latency recommendations than before, in part due to competitive pressure from algorithmic multitouch attribution (MTA) providers (see Market Guide for Marketing Mix Modeling). Both MMM and MTA measure marketing impact across multiple channels, with some vendors merging this pair into larger measurement solutions. The recommendations in this document have surfaced from interviews with MMM providers and practitioners, but can be applied to enhance existing or planned MMM, unified measurement or algorithmic MTA projects. For a more detailed comparison of these techniques, see Measure the Impact of Marketing Using These Four Methods.

## Examples of Marketing Mix Modeling

- An automotive manufacturer determines how its global brand “halo” impacts each of its nameplates differently. By optimizing spend to account for those unique effects, the manufacturer increases marketing effectiveness by 17%.
- A regional bank uncovers large performance differences by channel and lowers overall marketing spend through television cuts, while still increasing top-line sales by investing in more effective magazine and radio placements.

These real-world MMM examples reinforce its value as an analytic tool that balances investments across tactics. When deployed correctly, MMM can answer diverse questions, such as:

- What percentage of my marketing budget should I allocate to different channels?
- How are outside factors (e.g., changes in relative price, shifts in consumer confidence or swings in share of voice) altering my marketing effectiveness?
- How effective is my digital marketing at driving in-store sales?
- What is the overall return on investment for my marketing activities?
- How should my marketing spend vary by market?
- Which of my marketing activities are most important for building my brand, and which are most important to directly driving sales?
- How do I invest in a brand in a way that focuses on tangible benefits to raise engagement across the customer journey?

## Why Improve Your Existing Mix Model?

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CMOs tell Gartner they invest more than a quarter (25.7%) of their overall budget into paid media. According to the 2022 Gartner CMO Spend and Strategy Survey, this spend is spread across a diverse mix of channels, including social advertising (10.1%), search advertising (9.8%) and digital display advertising (9.3%). (See The State of Marketing Budget and Strategy in 2022.) Properly applied, marketing mix modeling improves the return of those significant investments.

However, accurate measurement and forecasting of marketing activities are complicated by:

- An increasingly restrictive data privacy landscape
- Interactions across sales channels, such as in-store advertising impacting online purchases
- Customers shifting media consumption patterns
- Greater demand for in-flight campaign changes
- The proliferation of new media options

One recent macro change that Gartner has observed is the need for sustained brand investment. The 2022 Gartner CMO Spend and Strategy Survey cited brand strategy and activation as one of the top three capabilities vital to adding the most unique value to marketing organizations' strategies. MMM can help CMOs quantify one of their trickiest investments to measure: upper-funnel activities that build brand sentiment and consideration, but are not focused on driving immediate sales. With increased delivery cadences, MMM can provide monthly updates on brand metrics that are useful for filling in the gaps of less-frequent brand-tracking surveys.

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*MMM is one of the best approaches to measure the financials of brand investments. Imagine a product or service with a six-month sales cycle. Sales are driven by a healthy marketing budget with investments across the marketing funnel to drive awareness, consideration and, finally, sales.*

*Since the average marketing mix model looks at three years of history, that means the MMM would capture, quantify or measure the vast majority of upper-funnel spend. MMM would capture an even greater portion of midfunnel impact.*

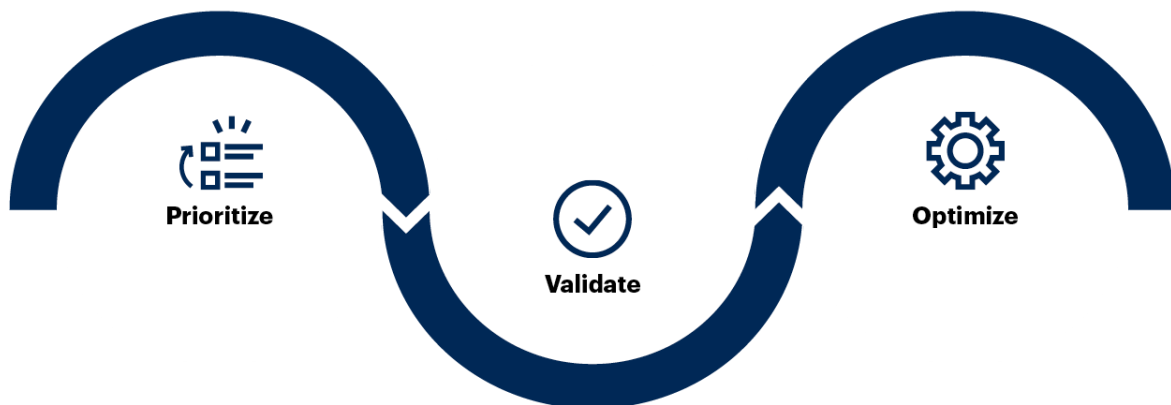
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While MMM offers significant opportunity to increase returns on media investments, the models require consistent reevaluation in order to deliver the expected benefits (see Figure 1).

**Figure 1. Three Opportunities to Improve Marketing Mix Modeling**

## Three Opportunities to Improve Marketing Mix Modeling

How to Improve Marketing Mix Modeling



- Rank desired insights based on their ability to improve marketing spend
- Flag additional ideas for future model iterations

- Identify findings that need further validation
- Focus on findings where there is hesitancy to act

- Use optimization and what-if capabilities to create a higher-performing and more resilient media plan

Source: Gartner  
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This document explores three topics to investigate during the next review of your marketing mix model:

- Have you prioritized the insight objectives for your MMM? Is your marketing mix model actionable – meaning, do the outputs inform adjustments to marketing activities? This often involves adjusting spending levels, but could also include shifts to frequency or channel mix.
- Are you sufficiently assessing your marketing mix model to ensure that the predictions are delivering true incremental business performance and can be trusted by executives across the organization?
- Are you taking full advantage of the scenario planning, optimization and simulation opportunities that your MMM provides to improve future marketing efforts?

## Analysis

### Develop an MMM That Meets Your Current Insight Needs – Don't Settle for High-Level Aggregations

**The Problem:** Marketing mix models answer a wide variety of questions, but different questions often require different input data. Imagine a U.S. insurer that builds a single marketing mix model at the national level using weekly data. This data structure allows for measuring the impact of TV on organic search, but cannot provide insights on differences in markets or the best TV ad placements by linear versus over-the-top (OTT). Why? Because all TV impressions are aggregated to a weekly level for the whole country.

**The Solution:** Know your most important questions, and rank them in order of priority. These rankings will help guide data requests and prioritize investments. A model's scope generally increases as findings get more detailed, the frequency of scoring updates increases, more data sources are included and more interactions across brands or channels are analyzed.

To help manage scope:

- Prioritize questions that your department is likely to act on, so you can secure the early wins that will help justify further investment.
- Ensure that data requests are sufficiently detailed to answer your prioritized questions. When in doubt, bias your requests toward more details, such as aggregating impressions by daypart, geography, campaign type and placement. Brands that can tie conversions to individuals, such as retail banking and digital commerce, should explore tracking marketing impact at a customer-segment level.
- Draft a roadmap of future insight objectives. It's not uncommon for brands to apply MMM for five or more years and yet still need to modify the approach to answer new questions.

Scoping your MMM program properly will accelerate your organization's willingness to take action on the results. Increasingly, providers are modeling for multiple KPIs, and surfacing those results in their reporting interfaces. Campaigns and media channels that drive bottom-of-funnel activities, such as transaction and search, have lower top-of-funnel influence, but the details vary by activity and brand. By "toggling" across outcomes, a marketer can gain a better understanding of these complex and cascading effects.

Gaining agreement on essential insights builds trust, a key component of successful MMM projects. The more trust your organization has in MMM, the more channel decisions are influenced by analytics and the more likely the marketing analytics function is considered essential to success (see Figure 3). For more on building trust in the model itself, with the marketing function and with your executive peers, see [Build Trust in Marketing Mix Modeling Across Your Organization](#).

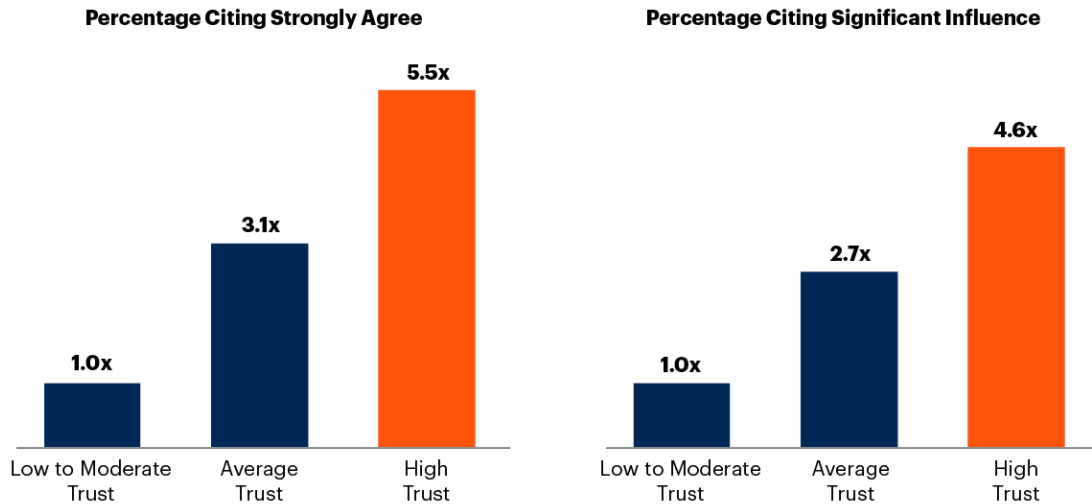


Figure 3. Trust in MMM Correlates With Impact of Marketing Analytics

**Trust in MMM Correlates With Impact of Marketing Analytics**

Q: “The Insights Provided by the Marketing Analytics Team Are Essential to Our Organization’s Success.”

Q: Level of Influence of Marketing Analytics on Changing the Channels Used for Marketing or Advertising



n = 377 consumers of marketing analytics (base varies by item)

Q. Please rate your agreement with each of the following statements.

Q. What level of influence does marketing analytics have on each of the following decisions?

Source: 2022 Gartner Marketing Data and Analytics Survey

Note: Bars represent the proportion of respondents citing strongly agree or significant influence by level of trust in MMM  
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**Prove the Validity of Your MMM’s Predictions to Yourself and Your Colleagues – Don’t Just Believe the Experts**

**The Problem:** Accurately modeling the impact of marketing on consumer behavior is challenging due to the high number of variables involved. Good marketing mix models are a powerful tool to untangle the web of causality among these many factors. Still, separating the signal from the noise can be tough, particularly because some common forms of MMM don’t have enough data points to accurately quantify the signal (see Note 1).

**The Solution:** Treat your marketing mix model as a credible suggestion, not as a mandate that must be followed. How can you determine how hard to listen? One good way is to test your models’ predictions. Simpler tests often mean making a few spending changes, then waiting several time periods to assess actual versus predicted results. These are sometimes called “in-market tests.” As your model passes these tests, its influence on your marketing plan should increase. For more on conducting in-market tests on your MMM, see How Marketing Operations Leaders Validate Their Marketing Mix Model.

In-market tests have a bit of a circularity problem. You are effectively saying, “I made the changes that MMM recommended, and then that same (hopefully updated) model measured them and said they worked.” Some marketers exclude their MMM providers from designing and performing these tests, and use only internal analytics resources to mitigate this problem. Other marketers who are uneasy by what they perceive as a roundabout measurement pursue more complex tests.

More complex tests often involve comparable geographic markets. In these tests, marketing spend varies dramatically for one or more channels across carefully matched markets. Then, the difference in the target variable across markets, often incremental sales, is tracked. For a step-by-step guide in setting up these types of tests, see [Expand Your Measurement Toolkit With Matched-Market and Store Tests](#). These tests require higher investment because they often require coordination among multiple, usually four, teams: marketing strategy, media buying, operations and mix modeling. Not all channels have the same ability to isolate a control group. In practice, certain digital ad networks or national campaigns may have to be excluded from these types of tests to maintain control group isolation.

Though complex, tests of this type can answer several important questions, such as:

- Is the model accurate overall? Was the model’s predicted outcome correct for each market? (See Note 2.)
- Is the model correctly predicting interactions among channels? For example, in the market where spend was decreased for a given channel, did performance also decrease in other channels that were predicted to receive a positive boost or halo from that decreased channel?
- How much incremental sales can be credited to changes in the media plan? For an example of how one brand answers this, see [Case Study: A Successful Approach to In-Housing Marketing Mix Modeling \(Polaris\)](#).

## Use Simulations and Optimization to Generate Better Marketing Plans – Don't Just “Keep Score”

**The Problem:** Since marketing mix models attempt to quantify the incremental impact of all included marketing activities, they are sometimes used solely for that purpose. But, at its core, the marketing mix is a predictive model. It is more than a *scorekeeper*; it is a *coach* that provides guidance on future marketing activities. As such, marketing leaders should spend considerable time evaluating how those predictions can be used to improve future marketing plans or even adjust spending levels on in-flight campaigns.

**The Solution:** It is common for marketing mix providers to provide a simulation interface or tool. This allows marketers and other stakeholders to game out different future states and test investment strategies that vary by geography, product, channel mix, channel execution or level of marketing spend. Beyond enabling the adjustment of marketing levers, scenarios can modify external factors included in the model. These tools commonly include an optimization engine that reveals the optimal future marketing spend based on a series of assumptions in marketplace dynamics and budget constraints. These optimized media plans provide a useful starting point that you can further modify based on business objectives.

These planning tools try to account for marketing elasticities and the fact that each marketing activity is on a different part of a unique response curve. In other words, the same change in marketing spend can have noticeably different impacts across marketing activities, such as paid search versus display.

The level of supported planning guidance is getting more detailed. This type of guidance can be particularly valuable for brands that do a variety of promotions in nondigital channels, such as weekly newspaper inserts. This level of reporting can also help quantify halo effects where the promotion of one item also increases sales of a second, unpromoted item.

Effectively using scenario planning is more critical than ever as CMOs face increased economic uncertainty. For example, an automotive manufacturer could forecast how a competitor's hypothesized increase in advertising spend or a drop in gasoline prices will affect marketing performance. Will either change alter overall marketing efficiency? Does either change modify the most effective tactics, channels or creative? The manufacturer can then assemble a plan for the factors that are most important to monitor to ensure that planned marketing outcomes are delivered.

## Improving MMM Is a Journey – Don't Stop at Your First Destination

Across interviews with marketing leaders, we heard many talk about upcoming improvements to their MMM program. Examples include:

- Testing new data sources to better understand an external factor
- Hiring an additional resource to influence additional marketing teams
- Conducting an analytics deep dive on a certain channel
- Testing a specific recommendation in the field
- Embedding forecasts deeper in the planning process

Everyone could answer, “What is next for your marketing mix efforts?” So at least once a year – ideally more frequently – assemble key stakeholders involved in gathering the input data, building the models and using the results to adjust media plans. Then, discuss and commit to improvements in at least one area:

- **Prioritize:** What new insights does the model need to deliver?
- **Validate:** What actions do we need to take to increase organizational trust in the model outputs?
- **Optimize:** What additional simulations would improve the marketing planning process?

## Evidence

This research was supported by interviews with marketing leaders using marketing mix modeling, as well as briefings and interviews with vendors that provide MMM platforms and/or services.

**2022 Gartner CMO Spend and Strategy Survey.** The purpose of this survey was to look at top-line marketing budgets, and identify how evolving journeys, C-suite pressures and cost challenges impact marketing's strategies and spending priorities. The research was conducted online from February through March 2022 among 405 respondents in North America (n = 190), Western Europe (n = 181) and the Nordics (n = 34).

Respondents were required to be involved in decisions pertaining to setting or influencing marketing strategy and planning, as well as have involvement in aligning marketing budget/resources. Seventy-four percent of the respondents came from organizations with \$1 billion or more in annual revenue. The respondents came from a variety of industries: financial services (n = 66), tech products (n = 38), manufacturing (n = 49), consumer products (n = 42), media (n = 35), retail (n = 40), healthcare providers (n = 57), IT and business services (n = 35), and travel and hospitality (n = 43).

**2022 Gartner Marketing Data and Analytics Survey:** This survey was conducted to explore the characteristics of marketing analytics teams and the role of marketing analytics in decision making. The research was conducted online from May through June 2022 among 377 respondents from North America (n = 211), Western Europe (n = 147) and the Nordics (n = 19). Respondents were required to use marketing analytics to inform decisions and were screened for their level in the organization, primary function and scope of responsibility. Fifty-five percent of the respondents came from organizations with over \$2 billion or equivalent in annual revenue.

Respondents came from a variety of industries, including financial services (n = 63), healthcare (n = 55), consumer products (n = 52), retail (n = 48), manufacturing and natural resources (n = 39), IT and business services (n = 36), media (n = 34), technology products (n = 29), and travel and hospitality (n = 19).

*Disclaimer: Results of these surveys do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.*

## Acronym Key and Glossary Terms

Term	Definition
Marketing mix modeling (MMM)	MMM refers to software and services that marketers use to evaluate their overall marketing plan and assign value to various marketing activities. MMM applies econometric regression techniques to estimate the aggregated impact of marketing activities on desired outcomes, such as sales or lead generation. Because it uses aggregate data, MMM is often called a “top-down approach.”
Multitouch attribution (MTA)	MTA refers to software and services that help marketers evaluate how much credit to assign to each element of a multichannel marketing campaign or each touchpoint leading to a conversion. Models may use business rules, algorithms and experimental controls to isolate events on the conversion path to determine their relationship to a desired outcome, such as a sale. Because it uses individual level, rather than aggregate, data, attribution is often referred to as a “bottom-up approach.”
Over-the-top (OTT)	Over-the-top television or video refers to on-demand or live programming streamed to any device over the internet.

### Note 1: Target Data Points

It is not uncommon for a marketing mix model to have only 156 target data points. This would equate to aggregated weekly sales for three years ( $52 \times 3 = 156$ ). Despite the limited number of target data points, these models typically have dozens of potential predictors, such as impressions by channel and subchannel, seasonality of consumer demand, and external factors like weather or gasoline prices. It’s difficult to quantify the causal relationships of many predictors with so few data points. Marketing mix modelers try to amplify the signal in these models by using more sophisticated techniques or simply changing the models to daily data feeds, but there is a limit to what they can do. This is one reason why it is important to validate some of the predictions in the model.

Marketers consuming these models should remember that mix models generally have much less target data and a more complex set of input variables than most other predictive models that support marketing. In practice, mix modelers may discuss hold-out predictions, mean absolute percentage error (MAPE) and R-squared statistics to build confidence in their models. These three options should be considered a starting point for marketing leaders expected to adjust their media plan based on the recommendations. Marketing mix models are fundamentally different from product recommendation models or targeting models – the decisions made from them are bigger and more causal in nature, but there is less data to train them. These differences make these models more directional, and increase the importance of seeking additional validation (beyond model fit statistics).

## Note 2: Limits to MMM Accuracy

Several factors – such as changes to marketing creative and signal leakage – are not included among the external factors controlled for by the mix model. This makes it unreasonable to expect a 100% match between predictions and reality. A best practice is to agree before the results are in on what will be considered success and what allowances should be made. Signal leakage occurs when respondents in the “control” group still received media from which they were meant to be excluded.

## Document Revision History

CMO's Guide to Marketing Mix Modeling - 3 September 2020

Master Marketing Mix Modeling to Maximize Your Media - 12 March 2019

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## Recommended by the Author

Some documents may not be available as part of your current Gartner subscription.

Build Trust in Marketing Mix Modeling Across Your Organization

Market Guide for Marketing Mix Modeling

How Marketing Operations Leaders Validate Their Marketing Mix Model

Broaden Your Marketing Measurement Toolkit to Address Both Tactics and Strategy

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