

WHAT'S NEXT

THE BEST OF BOTH WORLDS: INTEGRATING ONLINE DATA INTO MARKETING MIX MODELS

BY NEIL CANTER, ROSS LINK, AND SCOTT MCKINLEY

Marketing mix modeling has never been more valuable to CMOs – and the need for effective models never greater – than today. Constant budget pressures and an exploding array of consumer touch points have dramatically increased both the difficulty and the competitive value of getting one's marketing mix right. There are new multi-touch attribution models for digital media that offer extraordinarily precise data, but their effectiveness in modeling the offline world is still a work in progress. What CMOs need to balance the full arsenal of marketing inputs is a way to combine the granular data available from these new digital models with the power of the best marketing mix models. The answer can be found in applying a well-established mathematical technique to incorporate the results of multi-touch attribution models into established marketing mix models.

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For over 25 years, marketing mix models have been the gold standard for CMOs seeking to determine the level and optimal allocation of spending among the various components of their marketing budgets. Over time, the models have grown in sophistication and done their job well. When tested, the models created by reputable “shops” are found to be highly accurate, and their overall efficacy has remained strong even with the emergence of online media in the last few years.

However, the recent proliferation and growing significance of digital channels has introduced new consumer touch points and a host of interdependencies that did not exist before. Now a banner ad might lead you to a search to a company website to a purchase. To capture the dynamics of this new world, new multi-touch attribution models (MTAs) use person-level data and attribute “credit” among these different touch points for the sale that results.

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A number of companies are suggesting that MTAs’ ability to model at the person level is making traditional marketing mix modeling redundant, largely because marketing mix models use store- or market-level data, which is less precise than person-level data. However, in order for MTAs to replace marketing mix models, the attribution modelers must find a way to incorporate *offline*

data into their models accurately – given that offline represents about 95% of the marketing data that needs to be included. Our experience indicates that this cannot be done effectively yet by MTAs, although we as well as the industry are certainly making progress.

This in no way diminishes the value of the new granularity of digital data. It should be an important input to any model, but that is not what is happening in general. Most modelers today are simply making a choice between one model or the other. Either they are *using more granular data with less coverage* (i.e., adopting the new digital MTA models that deal in person-level data online, but do not effectively incorporate what’s happening offline), or *using less granular data but more coverage* (i.e., staying with the current mix models,

which capture what's happening both online and offline, but only at the level of markets or stores, not individuals). The first choice doesn't yet provide a usable answer, and the second choice completely ignores the rich digital data available today.

Obviously, one wants the best of both worlds. As such, importing the results of MTA models into existing marketing mix models at an analytic standard comparable to what CMOs have come to rely on is the challenge of the day. We believe we have solved this challenge by adapting insights from a field of mathematics known as Bayesian statistics. We believe our process, which we call Intelligent Priors¹, is the most reliable way to integrate digital data into marketing mix models.

In what follows, we look briefly at established marketing mix modeling and some improvements that have already been made to capture the interdependencies introduced by digital interactions. We then look at what modelers are doing to incorporate digital data, and explain why we believe our process yields superior results. We close with an overview of what the current, emerging and future state of modeling looks like.

ESTABLISHED MARKETING MIX MODELING

Marketing mix modeling has evolved to answer three questions of central importance to marketers:

Efficacy: How do I know if marketing spend helps my business?

Budget: How do I know the right amount to spend?

Allocation: How should I allocate that spend among TV, other offline media, online media, and promotion?

A marketing mix model is really just a recipe for sales: you mix the ingredients – your investment in TV, your investment in radio, and so on – in order to create a certain level of sales, just as you mix flour, eggs, sugar and so on to make a cake.

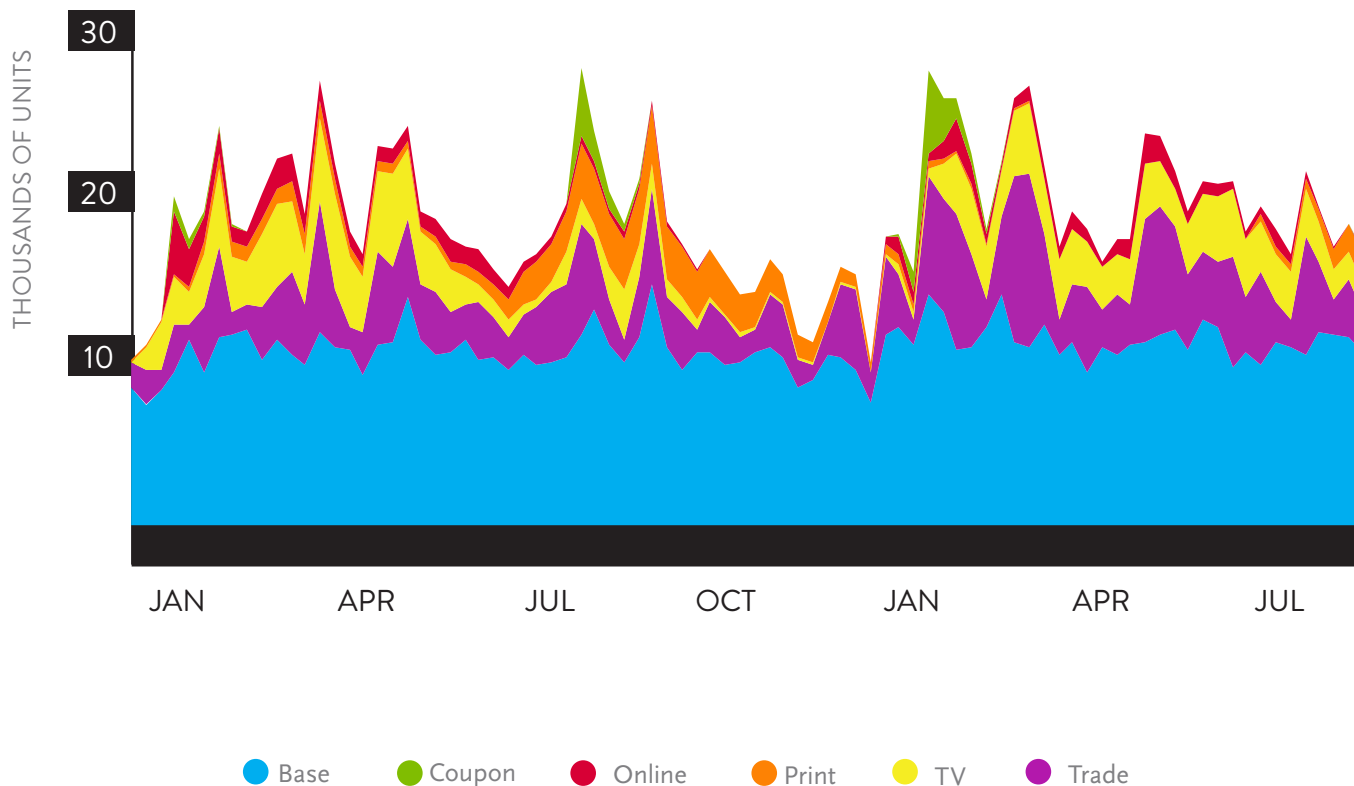
¹ Intelligent Priors® is a registered trademark, with a patent pending.

To work out the right recipe for a given business, you derive a model for the effect of marketing and non-marketing factors in different channels from a couple of years of data, and then test it on another set of data, iterating until the model predicts the results as accurately as possible.

Exhibit 1 (a randomly selected model) shows you what each “ingredient” – how much money you put into each channel – gets you in incremental sales. (The blue “base” area is the business that would be expected if you stopped actively marketing your product for a while, and simply kept shipping it to stores.)

Once you have this worked out, you can build simulators that answer “What if?” by allowing you to experiment with what happens to profit and share as you make greater and lesser investments in each medium, and optimizers that answer “What’s best?” by finding the minimum budget necessary for any desired level of expected incremental sales.

EXHIBIT 1 - DECOMPOSED VOLUME CHART



MARKETING MIX MODELING PLUS

As noted, the new digital landscape has created a world of dynamic marketing interdependencies at the person level that didn't exist before. *Synergies* among marketing programs have long been known and their effect incorporated in the modeling, but the need to capture direct *interdependencies* among marketing tools is new. Newspaper ads don't lead people to TV ads, and TV ads don't drive them to radio spots. But the different forms of online advertising absolutely do lead people down the click trail that is today's digital path to purchase.

MTA models, which track that digital path, are limited because they can't measure accurately offline what they measure so accurately online. It's important to understand why this is. A good MTA model uses millions of individual users' click trails. One such click trail might determine that Respondent 5315 was served a banner ad at 9:30pm on 8/24, clicked a paid search link at 7:24am on 8/26, and made a purchase at 3:13pm on 8/28. This is a remarkable level of granularity. However, to extend it to offline media such as TV, the modeler needs to be able to add TV exposures into the click trail at the individual level *with timestamps*, or he or she no longer knows what followed what. However, even in the U.S., where we have some of the most granular data available, clean, usable TV exposure data is not available at the individual level for enough of the population. This will change soon. Until then, however, MTA modelers must solve for this with very rough estimation techniques, with predictably rough results.

A small number of modelers seeking to incorporate what is going on online into marketing mix models have, however, been developing different ways to handle interdependencies within online media and between online and offline media today. We ourselves do this using a mathematical treatment based on the modeling power of something called Bayesian networks. We think it does the best job possible today incorporating granular online data into marketing mix models, and the results can be retrofitted onto an existing marketing mix model. This is an enormous advantage if you have a large existing base of marketing mix models. It means you can use these online-data inputs to adjust the models you have already instead of investing the time and money to rebuild them from scratch.

This is where the leading-edge of the industry is currently, and it should give comfort to any CMO wondering about marketing mix models' ability to accommodate the complex online world as well as its well-understood offline cousin. But as digital activity becomes a larger part of the consumer experience, there is an emerging need for something more sophisticated. This is where it becomes important not merely to draw on granular digital data, but to bring the precise outputs of MTA models together with the market comprehensiveness of traditional marketing mix models. We are now beginning to do this with Intelligent Priors, which enables us to import the actual results of MTA models into existing marketing mix models.

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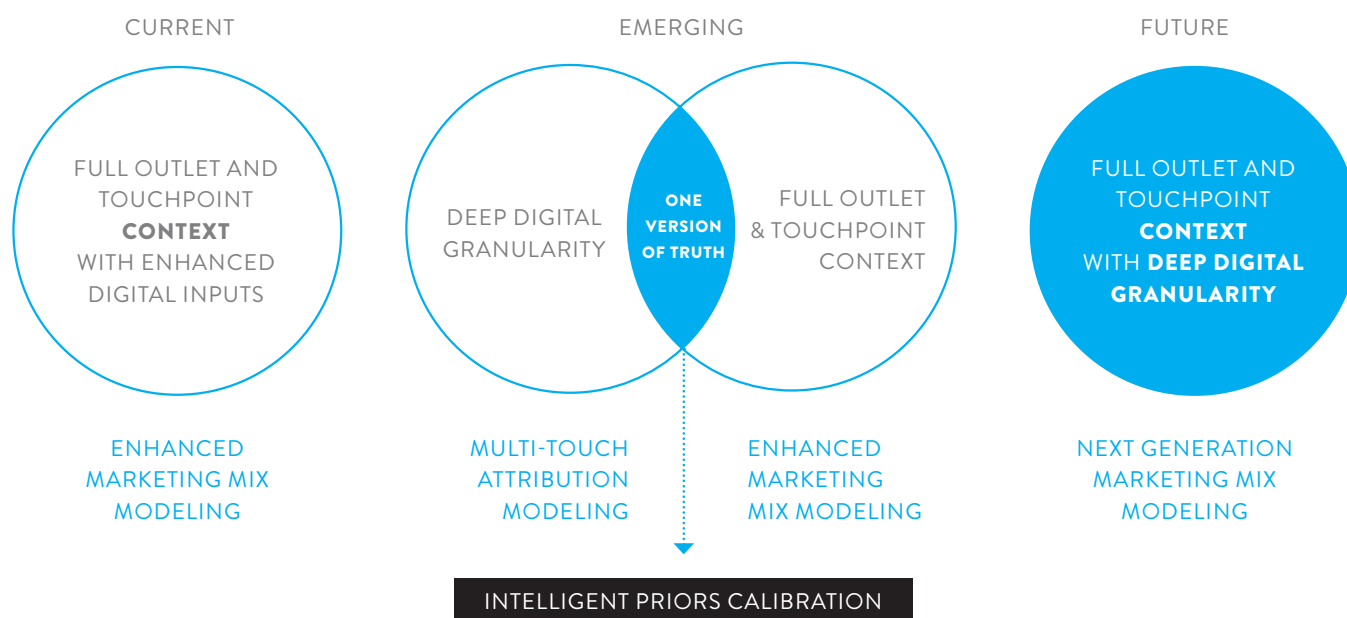
This allows marketers to be sure they are not somehow missing insights from the rapidly growing world of digital data when making decisions about how to allocate their marketing dollars. And, as noted, it also saves them from having to invest in a new, full-scale modeling effort or from disrupting the models they have relied on for years.

THE ROAD AHEAD

We have talked about where we are *currently*, and about what is *emerging*. We think it's useful to add into the picture what we believe the future will look like. Exhibit 2 illustrates these three stages.

- Current: some (not many) modelers offer an enhanced picture of what is going on in the digital realm to supplement the comprehensive coverage offered by their marketing mix models.
- Emerging: we are beginning to use a well-established mathematical technique to incorporate the results of MTA models via Intelligent Priors into our marketing mix models.
- Future: when we have time-stamped, person-level data for *all* the online and offline input variables that must go into a model, we will reach the world of the future, and MTA models and marketing mix models will become the same thing.

EXHIBIT 2 - INTEGRATING ATTRIBUTION MODELS



The longer-term future will, we hope, fulfill all of our aspirations for MTA modeling: person-level analysis across all significant touch points online or offline. As one contribution to bringing that day forward, we are leading an industry “research on research” consortium of publishers, including Facebook, Google and seven major FMCG marketers, to achieve consensus on the best way to measure the effectiveness of digital, social, and other ultra-precise media in marketing mix models. The first phase of this research concluded that current models underestimate ROI from Facebook marketing and Google paid search by anywhere from 4 percent to as much as 48 percent. That said, accounting for media interdependencies using Bayesian networks suggested that, on average, approximately 25 percent of sales attributed to paid searches in marketing mix models should be shared with other media that drive people to search engines. Clearly, then, taking a sounder approach to measuring interdependencies makes a real difference in making informed decisions about online and offline media.

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This is what's next: The immediate future lies in a marriage between the digital *granularity* of multi-touch attribution and the full market *context* of marketing mix modeling. Through such a marriage, we can deliver “one truth” so that marketers aren't seeing two different pictures of the world they work in – one online and one offline. Only by doing so can we provide marketers with what they need to make decisions about media effectiveness, efficiency, and optimization in a rapidly changing media landscape.

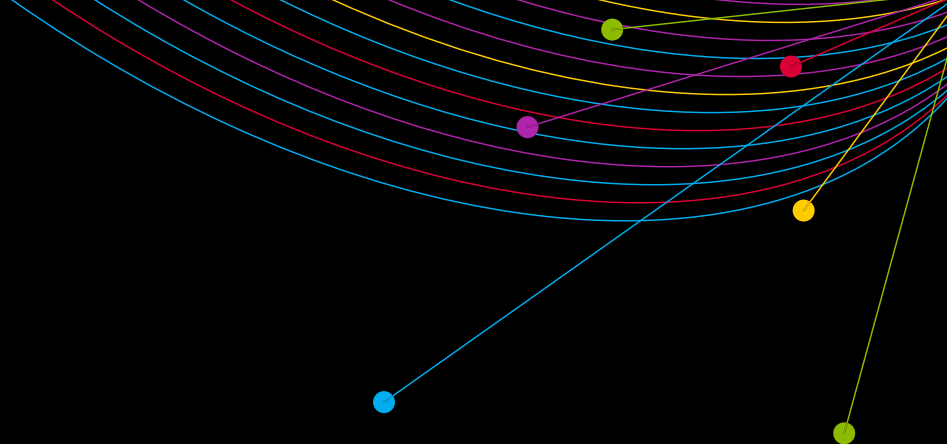
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