Introducing

ROI / Attribution Provider Comparison
Purpose

• Addresses a critical topic in time of evolving, fast-pace innovation

• Industry wrestling with:
  • Range of analytic providers
  • Variety of data sources
  • Wide array of statistical techniques

• Goal of the guide: advance the dialogue between buyers and sellers
Introducing!

- Committee identified key providers and key variables for comparison
- Comprehensive and collaborative information-gathering process
- Providers reviewed their profiles with twice in the Fall, 2017
Providers grouped by primary offering

Shown in alphabetical order
Detailed explanation of the variables used in the comparison

Provider Comparison Contents

- **Company Positioning**
  Short overview of company’s main reason for being

- **Primary Offerings**
  Rough share of business from attribution and marketing mix projects; can exceed 100% due to multiple offerings

- **Approach**
  Statistics most commonly employed (See glossary)

- **Use Cases**
  Applications of the analytics in digital, cross-platform or full marketing mix assessment

- **KPIs Delivered**
  Online traffic/conversion, offline retail traffic/sales and brand metrics

- **Optimization Areas**
  Digital or cross-media channels, across sales and brand metrics

- **Media Covered**
  Full range of media vehicles included in the models

- **Source of Television Data**
  Modelers have a range of television viewing data, including Nielsen, Smart TV and set top box data

- **Level of Media Granularity**
  Level of detail at which the modeler works

- **Model Inputs**
  Other marketing variables (e.g., price/promotion), external influences (e.g., weather, etc.) and competitive behavior modeled at a similar level

- **Advertising Parameters**
  Diminishing returns, adstock, long-term-effects, media interactions and halos, baseline and incrementality

- **Data Integration Methods**
  Process for combining cross-platform datasets in the model

- **Collinearity Work-Arounds**
  Statistical approach to teasing out events or investments that occur at the same time

- **Model Validation**
  Method for determining the accuracy of the model findings

- **Data Delivery Options**
  Dashboards, inflight-optimizers, programmatic media, data feeds to other applications

- **Cycle Time**
  Typical model update intervals
Color-coded “interstitials” with comments on the industry sectors and current offerings.

Providers have been grouped according to their core, or original, offering – a somewhat subjective grouping. Marketing mix modelers (MMM) are the originators of ROI modeling, with the first commercial firms offering these services in 1989. Ironically, both Marketing Management Analytics (MMA) and Hudson River Group, the two veterans of 1989, declined to participate in this study. Accenture, the consulting firm with a significant analytics practice, is also not included here for the same reason.

MMM firms originally built regression models at the “market” level — DMAs or other sales territories — with observations by week. Today, they all offer more granular analytics with finer geographies and shorter time periods, and have also developed attribution capabilities within their MMM framework, “Unified Models.” Simple linear regression has given way to more advanced statistical techniques, frequently hierarchical Bayes (see glossary). However, the regression model built on weekly DMA level data is still a common denominator.

Marketing mix models typically incorporate all of the controllable (trade spending, for instance) and uncontrollable factors (weather, for instance) of the marketing mix, and produce a sound estimate of the sales contribution and ROIs of each. As a result, they provide valuable strategic insights. The “negative” often associated with these models is the flip side. They require 2-3 years of historical data, making them backward-looking, and are not sufficiently granular to drive tactics.

Marketing mix models are also able to estimate both the short-term and long-term effects of advertising. However, this is not frequently done since advertisers focus almost exclusively on short-term performance.

Not all of these modelers are the same. Nielsen and IR have exclusive access to their store-level data, which provides the perfectly defined view of retail promotion tactics so important to CPG marketers. Marketing Evolution and Millward Brown both have consumer-level techniques that look below the market level, more like attribution modelers. But their ability to provide a more comprehensive view of the marketing mix gives us reason to group them here. The unique benefit of these approaches is that they can be both strategic and tactical, and offer insights into consumer segments.
Simple yet comprehensive view of provider offerings

The variables stay the same, but not all providers have “solid dots” in each category
Attribution modeling was born in the digital media ecosystem as a way of attributing credit to the various digital touchpoints on the path to conversion.

The earliest methods were arbitrary, leading to the notorious “last click attribution” that has been shown to grossly overstate the value of digital search. Over the past few years, there has been a dramatic infusion of science into attribution with all major attribution models now using advanced statistical models, most often logistic regression or hierarchical Bayes.

Importantly, these models now incorporate all digital touchpoints, qualifying as Multi-Touch Attribution (MTA). However, their treatment of non-digital media, non-media marketing factors and uncontrollable factors like weather and economy are highly varied. When the majority of the causal factors driving sales — or other consumer outcomes — are not included in the model, the chance of mis-attribution and misleading ROI estimates is material. Under these circumstances, relative tactical decisions can still be supported; for example, whether copy “A” is more effective than copy “B.”

Data is a bigger challenge for attribution modelers than it is for marketing mix modelers, although Inadequate data is the Achilles heel for all modelers. Attribution requires identifying the same consumer wherever they may be exposed — mobile phone, tablet, work computer, home computer or other media. Device graphs, a map that links an individual to all the devices they use, are the linking data sets used for this purpose. There are many proprietary device graphs, some with impressive scales, but we have seen very little validation work. The potential problem is that despite starting with a comprehensive and representative data set, after all of the variables have been matched to each other, the resulting data set will be much smaller and potentially biased. It is always wise to review the fully matched data set and make sure that it portrays your consumers as you know them.

As with the mix modelers, this group is not perfectly homogeneous. Markos, which was not born in the media world, originated in direct marketing. But the parallels today are striking.
Conversion Logic

PRIMARY USE CASE — Help marketers measure and optimize conversion events for online or offline sales, leads, registrations, mobile installs, etc., and enables long-term planning and budgeting decisions. Cross-Channel attribution.

PRIMARY OFFERINGS

<table>
<thead>
<tr>
<th>Marketing Mix Models</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Attribution</td>
<td>76%</td>
</tr>
<tr>
<td>TV Attribution</td>
<td>59%</td>
</tr>
<tr>
<td>Unified Models</td>
<td>59%</td>
</tr>
</tbody>
</table>

APPROACH

Person/Item-level attribution using machine learning in proprietary ensemble framework.

MEDIA COVERED

- User-level - Display, Video, Affiliates, Social, Mobile, Search, Email, Direct Mail, Native
- Offline - TV, Radio, Shared mail

LEVEL OF GRANULARITY

For offline channels: station, program, campaign, promotion, length, geo, reach down to creative campaign, etc.

For digital: impressions, clicks, campaign, placement, publisher, etc., sub-daily and at user-level support an open schema for granularity limited only by statistical significance.

COLLINEARITY WORKAROUND

Approximated Shapley values in cooperative game theory.

DATA INTEGRATION

Person level + time series for TV and radio; deterministic matching.

DATA INTEGRATION

MODEL/RESULTS VALIDATION

20% Holdout samples

CYCLE & REFRESH TIMING

Designed to run in real-time, refreshes hours/day/weeks.

USP CASES

- Contribution Assessment
- Digital Campaign
- Cross-Media Campaign
- Full Marketing Mix

KPIs

- Online Traffic
- Online Conversion
- Offline Retail Traffic
- Offline Sales
- Brand Metrics

Budget Optimization

- Across Digital Channels
- Across Cross-Media Channels
- Across Sales & Brand Metrics

MODEL INPUTS

- Other Marketing Variables
- External Influences
- Competitors

ADVERTISING PARAMETERS

- Diminishing Returns
- Adstock
- Long-term Effects
- Media interactions and Halos
- Baseline/Incrementality

DATA DELIVERY & APPLICATIONS

- Dashboard
- Optimizers
- Programmatic
- Data Feeds To Other Sources
Television or Digital Attribution Providers

This set of providers are more recent additions to the analytics marketplace and, while quite varied, are unified to some degree in their focus on either specific media or specific outcomes.

These providers are squarely in the attribution camp, attributing causality to media exposure based on a highly granular analysis of the sequence of events. For instance, exposures that occurred prior to a conversion, retail visit, or purchase event. While this may not be entirely suitable for estimating ROI, the granularity and rapid tempo of these models is well suited to driving tactical decisions.

The diversity among these providers is interesting. TVSquared and WyWy are now one company. Along with iSpot and Samba, they leverage Smart TV data to attribute digital activation outcomes to preceding television exposures. However, TVSquared also employs marketing mix models, in a minority of cases, to provide a more comprehensive assessment and also an estimate of the impact on offline sales. Placed is focused on location data and estimates the impact of television, digital and OOH media on location-based outcomes, like store visits. SMi’s roots are in media spend data and focus on the value of modeling the effectiveness and ROI of competitors’ marketing, which requires granular and accurate competitive spending data.
iSpot

PRIMARY USE CASE – Measures the conversions of TV ads exposure to digital business outcomes and related KPIs. Used for in-flight optimization of creative and media placements, campaign planning as well as TV investment decisioning.

PRIMARY OFFERINGS
Marketing Mix Models ........ N/A
Digital Attribution .............. N/A
TV Attribution .................... 10%
Unified Models .................. N/A

APPROACH
Fractional or full attribution of conversion credit based on a variable look-back window at the individual H/H/person level

MEDIA COVERED
TV, Live/SD – 30 days, Broadcast, Cable, Spot, Satellite, VOD and OFF

LEVEL OF GRANULARITY
Individual exposure/conversion level analysis, reported for individual creative executions, networks, programs, genre, daypart, media unit

DATA INTEGRATION
Proprietary device/ID graph to connect web users to TV IDs

COLLINEARITY WORKAROUND
Assigns (full or partial) credit to all exposures in the look-back window

MODEL/RESULTS VALIDATION
Internal and external audits/benchmarks

CYCLE & REFRESH TIMING
Daily

USE CASES
Contribution Assessment
- Digital Campaign
- Cross-Media Campaign
- (TV cont. to digital KPIs)
- Full Marketing Mix

KPIs
- Online Traffic
- Online Conversion
- Offline Retail Traffic
- Offline Sales
- Brand Metrics

Budget Optimization
- Across Digital Channels
- Across Cross-Media Channels
- Across Sales & Brand Metrics

MODEL INPUTS
- Other Marketing Variables
- External Influences
- Competitors

ADVERTISING PARAMETERS
- Diminishing Returns
- Adstock
- Long-term Effects
- Media Interactions and Halos
- Baseline/Incrementality
  (Unexposed control group)

DATA DELIVERY & APPLICATIONS
- Dashboard
- Optimizers
- Programmatics
- Data Feeds To Other Sources

RESEARCH PROVIDED BY SEQUENT Partners
Single Source Providers

The earliest single source data providers linked television advertising exposures directly to purchases at the household level. IRIS's BehaviorScan, the first of many, actually predates the commercialization of marketing mix modeling by a few years. Each of the early providers built their services on the foundation of traditional research panels, which proved unaffordable time and again.

Today's single source providers utilize existing data—notably loyalty cards, credit card, prescription records and DMV records—to provide measures of sales. These are linked at the household level with television exposure from set-top boxes and digital exposures captured via tags. Matching cause and effect at the household level resembles and begins to overlap with attribution models. The difference is one of emphasis and genesis. Attribution was born in digital, whereas single source was born in CPG, matching television ad exposures to supermarket sales.

These techniques are data dependent. NCS and IRI utilize their purchase and store panels, and NCS also employs the Nielsen television and radio ratings data.

The providers grouped here are not completely homogeneous. Oracle's DataLogix service has roots in direct marketing, not TV like NCS and Tivo. Concentric is the most different; it does not have proprietary data sets, but its agent-based models (ABM) can utilize any suitable data. It is grouped here because it operates at the individual household or consumer level.
Nielsen Catalina

PRIMARY USE CASE — Purchase-based audiences for better targeting, in-flight tracking, the impact of advertising on retail sales during campaigns, and sales lift measurements to analyze how advertising drove incremental sales after the campaign

PRIMARY OFFERINGS
Marketing Mix Models ............... N/A
Digital Attribution ................ N/A
TV Attribution ..................... N/A
Unified Models ..................... 100%

APPROACH
Test - control ANCOVA, machine learning, in extreme reach cases

MEDIA COVERED
Digital (including Mobile, Video, Social And Programmatic) to Linear TV, addressable TV, Print, Radio, and CRM.

LEVEL OF GRANULARITY
Analysis at the individual impression and transaction level: reported by media type, genre, type, property (e.g., program, website, title), campaign and creative execution

DATA INTEGRATION
Direct HH match or via indirect match with on-boarders like Neustar and LiveRamp

COLLINEARITY WORKAROUND
Exposed/exposed HH purchases compared to averages between groups

MODEL/RESULTS VALIDATION
Normative database, holdout samples, model fit statistics, synthetic data comparison

CYCLE & REFRESH TIMING
Weekly in-flight; 4-6 weeks for sales effect or cross-media

USE CASES

- Contribution Assessment
- Digital Campaign
- Cross-Media Campaign
- Full Marketing Mix

KPIs
- Online Traffic
- Online Conversion
- Offline Retail Traffic
- Offline Sales (CPG only)
- Brand Metrics

Budget Optimization
- Across Digital Channels (Indices provided for manual optimization)
- Across Cross-Media Channels
- Across Sales & Brand Metrics

MODEL INPUTS
- Other Marketing Variables
- External Influences
- Competitors

ADVERTISING PARAMETERS
- Diminishing Returns
- Adstock
- Long-term Effects
- Media interactions and Halos
- Baseline/incrementality

DATA DELIVERY & APPLICATIONS
- Dashboard
- Optimizers
- Programmatic
- Data Feeds To Other Sources
Three pages of glossary terms, from A/B testing to validation
Panel Discussion

• Newcombe Clark
  • Global Director, Rapid Learning Lab, AIG
• David Ernst
  • VP, Advanced Targeting Solutions, A+E Networks
• Claire Browne
  • VP, Director of Media Research, RPA