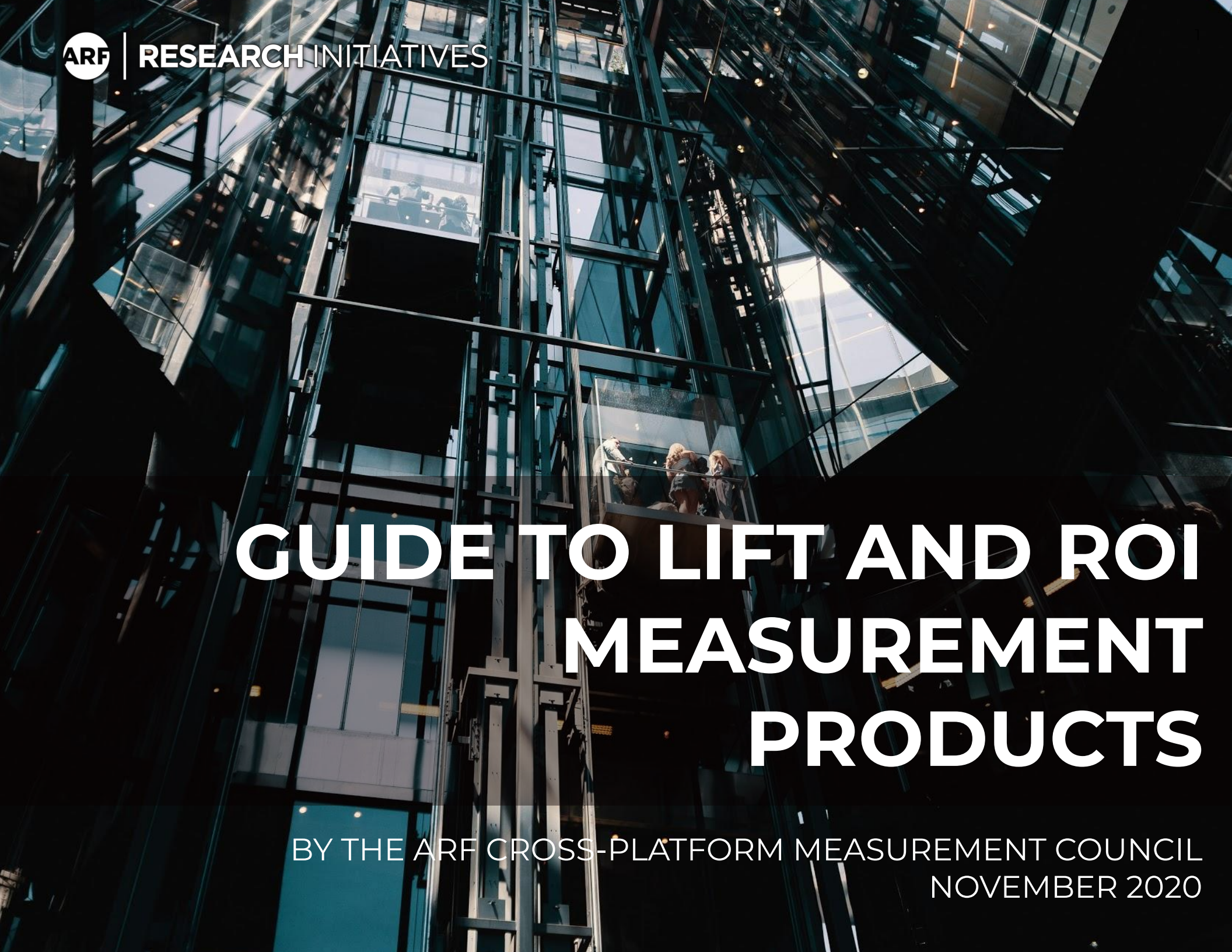

ARF | RESEARCH INITIATIVES

GUIDE TO LIFT AND ROI MEASUREMENT PRODUCTS

BY THE ARF CROSS-PLATFORM MEASUREMENT COUNCIL

NOVEMBER 2020

This paper was produced through the collective efforts of the **ARF Cross-Platform Measurement Council** Working Group on Online-Offline Metrics:

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CONTENTS

I. INTRODUCTION

Within the last decade, marketers have placed increased emphasis on understanding the impact of their media and marketing spending on relevant key performance indicators. A number of companies offer services for measuring "lift" and "ROI." Yet, at a time of great demand for these services, the Online-Offline Metrics Working Group of the ARF's Cross-Platform Measurement Council believed that many in the advertising and marketing industry knew little about them. They therefore saw a need to create a guide to those services. This guide is the result of their efforts.

Its purpose is to shed light on the ways that ROI, ROAS, and lift can be measured and who measures them. It aims to help those seeking such services and those who seek to better understand the range of offerings such companies provide. It contains information about 30 ROI and lift measurement products or services offered by 27 different firms. The companies were identified by members of the Online-Offline Metrics Working Group and the ARF.

The Working Group put together a questionnaire for these companies about their services, inputs, outputs, and approaches. The ARF programmed the questionnaire and emailed a link to the designated companies, along with a PDF of the instrument. ARF employees and members of the group followed up with these companies to obtain as many as responses as possible. The Working Group analyzed the aggregated responses to the questions, and members of the Working Group who worked at companies other than those on the provider list reviewed the responses to the open-ended and Other-Specify questions. Based on this review, the ARF put together individual follow-up questions for each company and sent them out to the providers.

With all the responses in hand, ARF researchers created the grids in this report for the closed-ended questions and edited the Other-Specify and open-ended responses for the sake of clarity and brevity. **The information contained in this guide therefore comes unfiltered from the companies themselves.**

The ARF and the Online Offline Working Group did not assess or evaluate their methodologies and does not recommend or endorse any of these companies or products. The Working Group's objective is to provide the advertising industry with information to help them learn about the range of choices, but not to guide decisions about which service to pursue. If you are interested in learning more about any of the services described here, we would recommend contacting that company directly. The ARF would be happy to provide contact information for each company.

There are three remaining parts of the Guide:

Part II contains a list of the companies included in the guide. ARF member companies are asterisked in this list. The list is followed by brief descriptions of the products provided by the companies.

Part III contains grids and tables showing the inputs, outputs, and basic features of each service. The information in the grids comes primarily from responses to the closed-ended questions. The grids are color-coded, with green indicating that the product contains the feature listed. In a couple of cases, yellow shading is used for characteristics with more than one possibility. Similarly, symbols are used in one part of each grid to simplify what would otherwise have been multiple pages. The grids also contain short written responses about a few features.

The grids and tables show multiple products together for ease of use. Each column of a grid represents one product or company. The products are divided into four groups:

Section 1: Contains products centered on analyzing sales as a dependent variable that typically incorporate data from surveys.

Section 2: Contains the products centered on analyzing sales as a dependent variable that do not typically incorporate data from surveys.

Section 3: Contains products that typically use a dependent variable other than sales that incorporate data from surveys.

Section 4: Contains the products that typically use a dependent variable other than sales that do not incorporate data from surveys.

Please note that many of the services listed in Sections 3 and 4 can use sales as a dependent variable if the sales data are provided by the client. By the same token, many of the providers in Sections 1 and 2 are capable of analyzing a dependent variable other than sales.

The tables that follow each grid contain paraphrased answers to the "Other" options that did not fit the options listed in some of the closed-ended questions. Some of the "Other Specify" responses occurred with sufficient frequency that they were incorporated as rows in the grids. The entries in the "Other-Specify" tables therefore do not contain answers from every company for every question. Only the companies that provided verbatim "Other Specify" responses not covered in the rows of the grid are shown in the tables.

Part IV is an appendix containing detailed verbatim descriptions of characteristics of individual products. These descriptions are drawn from responses to the open-ended questions. They have been edited for clarity and brevity. The appendix is organized by company, and the companies are shown in alphabetical order.

As you will see as you go through the guide, many of the features the Working Group asked about are incorporated into nearly every product; other features are more specialized. The more closely one looks, the more varied they appear to be.

There is no way that a guide, even one of this size, can do justice to each product's unique features and benefits. We hope, however, that this guide will serve as a general resource to get researchers and analysts started in figuring out what sorts of solutions they might want and where they might find them.

II. PRODUCT OVERVIEW

COMPANY	PRODUCT NAME	SECTION
605*	(1) Always-on ROAS (2) Random Control Trial (605) (3) 605 IMP4CT	1
Acxiom*	Campaign Effectiveness Measurement Services	2
Alphonso	Alphonso Insights/Alphonso Local	1
AnalyticOwl	AnalyticOwl – Detailed Attribution	4
Analytic Partners*	Analytic Partners GPS Enterprise	1
C3 Metrics	C3 Metrics Attribution Data Cloud	4
Comscore*	Brand Survey Lift	3
Cuebiq	Clara (Cuebiq's Measurement Platform)	4
Data Plus Math*	Data Plus Math (a LiveRamp company)	2
Dynata*	ADimension Campaign Effectiveness (Dynata)	3
Foursquare	Foursquare Attribution (fka Placed powered by Foursquare)	3
IRI*	IRI Cross Channel MTA	2
iSpot.tv*	iSpot.tv	1
Kantar*	Kantar Balanced Attribution (BA)	1
Kantar*	Kantar Lift Insights (BLI)	3
Kantar*	Total Marketing ROI (Market Mix Model) (TMROI)	2
LeadsRx	LeadsRx Attribution™	2
Lucid*	Impact Measurement by Lucid	3
Marketing Evolution*	Marketing Impact Measurement, Optimization, and Activation Platform	1
Merkle*	Archie Connected Attribution	2
Moat by Oracle Data Cloud*	Moat Outcomes	4
NCS *	NCS Sales Effect (SE)	2
NCS*	Sales Lift Metrics (SLiM)	2
Neustar*	Unified Marketing Analytics	1
Nielsen*	Campaign Lift	2
Ninth Decimal**	LCI	4
Samba TV*	Samba TV's measurement offerings: TV Boost, True Reach & Frequency Reporting, Attribution (Tune-in, Online, E-commerce, Location)	4
TVSquared	TVSquared ADvantage	4
Upwave*	Upwave (formerly Survata)	3
Veeva*	Veeva Crossix	4

* ARF Member

** Ninth Decimal was recently acquired by InMarket; update on the information in this guide not available at publication time.

PRODUCT DESCRIPTIONS PROVIDED BY THE COMPANIES

605

605 is an independent TV measurement and analytics firm that offers advertising and content measurement, full-funnel attribution, media planning, optimization and analytical solutions on top of our deterministic TV viewership dataset. 605's multi-source viewership dataset offers whole-home TV viewing visibility by combining the best attributes of STB and ACR data. 605 is unique in that our multi-source viewership dataset supports extensive deterministic data activation at the household level with currency grade national and local projections methodologies, all in a privacy compliant manner.

With full matching rights to the live and time-shifted viewing data of 21MM HHs, 605 offers clients the ability to measure the causal impact of advertising across a wide array of behaviors, including: TV tune-in, brand favorability (surveys), purchases, search activities, foot and web traffic.

605's mission is to solve the media measurement challenges facing the TV industry today. We accomplish this by offering a next generation view of the traditional TV universe, wrapped with a deterministic identity layer, currency grade projections and metrics. This view combined with 605's infrastructure allows us to solve for cross-platform and multi-currency, while supporting a path toward census based measurement.

605 is an active member of the ARF, CIMM, VAB and IAB, and we have strong relationships with the MRC. We believe that an industry approach leveraging these established organizations can change the MRC requirements or develop an alternative approach to accreditation that not only supports STB Data, but goes beyond the limitations of being a currency.

Acxiom Analytics Campaign Measurement

Effectively measure the incremental lift from your campaigns across all channels

Marketers are continually challenged with accurately measuring the impact of their marketing dollars and quantifying true ROI and ROAS. Acxiom's unbiased, closed-loop market campaign measurement offerings identify the incremental impact of digital and offline campaigns to improve marketing performance.

As a neutral, third-party measurement analytics provider, Acxiom supports brands with a full suite of cross-channel campaign measurement services that span offline and digital campaigns including addressable TV for better planning and overall marketing performance.

- **Accurate, unbiased approach you can trust**
  Accurately and unbiasedly measure incremental lift of omnichannel campaign performance on sales.
- **Consistent, repeatable process across all sources**
  Consistent campaign measurement of performance across all platforms / publishers or channels.
- **Impact measured at the personal level**
  Measure the exact number of individuals who were exposed to the message during a campaign by segment and conversion.
- **Understand characteristics of audiences who engage**
  Understand audience portraits by publisher, impressions, demographic and segment.

Brands should invest in independent campaign measurement to understand the importance of going beyond the free reporting and analytics provided by publishers and platforms to gain a complete and unbiased picture of their customers.

Alphonso

Alphonso is a TV data and measurement company, and the market leader in providing brands and agencies with real-time TV ad campaign measurement, closed-loop attribution for TV ads, and TV audience extension across digital devices. Alphonso TV Data Cloud services are used by hundreds of the Fortune 500 brands and agencies in the U.S.

With video AI technology embedded in tens of millions of smart TVs, TV chipsets, set-top boxes, and other connected devices, Alphonso understands what programming and advertising people watch on TV. Its SaaS offering, Alphonso Insights, delivers actionable TV measurement and closed-loop attribution with offline data in real time, to help brands understand the true impact of TV advertising. To learn more, visit www.alphonso.tv.

AnalyticOwl

AnalyticOwl is a leader in analytics and attribution for the broadcast industry, focusing on audience response to determine what motivates consumers to respond to advertising. AnalyticOwl is a cloud-based platform providing simple, easy-to-understand advertising attribution, analytics and actionable insights, from web lift to foot traffic, live read endorsements to podcasts and exposure to conversion. Today, AnalyticOwl operates in hundreds of markets for thousands of advertisers and processes billions of broadcast analytics for media companies, advertisers and ad agencies to measure and optimize advertising effectiveness. For more information about AnalyticOwl and its services, visit www.analyticowl.com.

Analytic Partners

Analytic Partners is a proven global leader in measurement and optimization. We turn data into expertise to enable our clients to create powerful connections with their customers, drive competitive advantage, and achieve growth goals. We do this through our proprietary technology platform, GPS-Enterprise, which is powered by the latest data science and accompanied by high-touch consulting. Our solution incorporates in-depth industry and business knowledge through our ROI Genome intelligence which provides deeper business understanding to support better, faster decisions.

With clients in 50+ countries, Analytic Partners provides world-class expertise, and client support for our GPS Enterprise solution.

GPS Enterprise is the foundation for our Commercial Mix Analytics solution which incorporates Commercial Mix Models (CMM), Experiments, Touchpoint, Customer and Operational Analytics and Branding Impact. Commercial Mix Analytics is a multi-dimensional, integrated, and holistic solution delivering adaptive and granular insights for Unified Commercial Decisioning which provide lift measurement and optimization across a wide range of KPIs. It includes comprehensive data ingestion, rapid processing of complex modeling, ROI Genome business intelligence, integrated experiments, and forward-looking insights. AP's Commercial Mix Analytics with Live Modeling provides real-time, right-time insights to support fast measurement and ongoing decisioning. GPS-E provides decisioning support to simulate future marketing plans, optimize for a lift goal or budget, balance multiple KPIs and war-game competitive actions. With GPS-E Commercial Mix Analytics, our goal is to deliver intelligence, insights and analytics faster, at scale to our clients to support their growth. Visit www.analyticpartners.com.

Comscore

Comscore Brand Survey Lift™ is a survey-based branding effectiveness solution that measures the total branding impact of cross-platform campaigns as well as lift attribution by network, publisher, placement and creative. Using flexible measurement and attribution methods, BSL provides marketers, agencies and media companies with insight into a campaign's ability to drive lifts in key branding metrics, such as awareness, favorability and purchase intent.

Cuebiq

Cuebiq is a consumer insights and measurement company, providing brands and marketers with a trusted, high-quality, and transparent currency for offline visitation data to map and measure the consumer journey. With Cuebiq's first-party, location-based analytics and measurement, clients can understand how their marketing activations are influencing consumer behavior and decrease their cost per incremental visit to store.

Our location-based data powers our proprietary platform, which at its core you can use to do the following:

- Drive consumers to store
- Measure incrementality of your cross-channel advertising
- Lower cost per incremental visit (CPIV).

With Cuebiq's revolutionary incrementality solution, you can finally understand the true impact of your cross-channel advertising. You'll never have to worry again whether your ads are actually driving new customers to store or not — we've got metrics to show you exactly that.

Data Plus Math (a LiveRamp company)

Video consumption today is fragmented across a multitude of platforms, screens and viewing modes, making it difficult to plan, place and measure marketing messages effectively. By mapping actual consumer ad exposure with real world behaviors such as purchases, store visits, app downloads and other online or offline outcomes, Data Plus Math, a LiveRamp company, is able to help advertisers, TV Networks and MVPDs power connected cross-screen video strategies and maximize outcomes for advertising campaigns.

Dynata

Dynata's ADimension® platform helps you evaluate and optimize advertising effectiveness so you can gather greater insights into how a campaign is influencing consumers at all levels of the purchase funnel. By combining Dynata's robust, accurate first-party data with dynamic dashboard reporting, you can understand the effectiveness of your advertising across all media channels, define the optimal media mix, and improve campaign performance.

ADimension allows you to:

1. **Measure key brand metrics:** Understand the impact of ad campaigns on exposed and control groups against KPIs
2. **Evaluate exposure:** Gain insight into ad and site exposure via our proprietary tagging and cookie technology
3. **Identify exposure:** Identify offline ad exposure through pre-control OTS groups recruited before a campaign starts
4. **Compare performance:** Ability to compare performance across different publishers and creative messages
5. **Integrated data sources:** Connect cross-media data sources to achieve a more robust view of your campaign's performance
6. **Multi-channel analysis:** Segment data by campaign, media type and in combinations using our interactive dashboard.

By utilizing our first-party panel data and methodology that facilitates consistent cross-media measurement, you can view lifts in key brand metrics and perceptions across all channels in one holistic measurement study.

Foursquare Attribution (fka Placed provided by Foursquare)

Trusted by 1000+ brands and 550+ publishers and platforms, Foursquare Attribution is the industry's leading multi-touch footfall attribution solution. We connect campaign exposure to real-world visits, revealing the true incremental impact of your ads, your top drivers, and your opportunities to optimize. Powered by the largest first-party, always-on panel of devices, we are persistently capturing the visits of consumers and connecting them to all your digital and traditional advertising to deliver insights to our customers with confidence.

Foursquare is the leading independent location technology platform, powering business solutions and consumer products through a deep understanding of real-world movement. With Targeting, Measurement, Places, and Analytics Solutions, Foursquare enables brands to understand, reach, and engage consumers with the highest quality location data.

IRI

IRI combines speed and automation of insights, powered by enhanced machine-learning-based recommendation engines and augmented decision-making, to drive sales and long-term brand growth, rather than just clicks or views. Our innovative market measurement and optimization offerings include IRI Unified Performance Lift, IRI Multi-Touch Attribution Lift, IRI Market Lift, IRI Household Lift, IRI Campaign Conversion Feed (CCF), and IRI In-flight Sales Optimization solutions, which are built into the industry-leading IRI Liquid Data® technology platform that allows clients to link POS data and household-level loyalty card/frequent shopper program data with demographic, causal and other third-party data sources like local intelligence data or store shipment data. For Retail and CPG/FMCG marketing, IRI is uniquely positioned to offer a 360-degree view of the consumer and support advertisers, their agencies and our media partners in better planning, targeting, activating, measuring and optimizing campaigns based on what the media consumers see and the products they purchase.

iSpot.tv

iSpot.tv is the market leader in real-time television advertising measurement and attribution. The company's always-on platform measures impressions and attention for all TV ads in a unified manner across linear, time-shifted, VOD, CTV, streaming and OTT environments. iSpot.tv's TV attribution solution enables advertisers and TV networks to plan, optimize and transact on business-outcome measures. The company delivers its solution in real-time via intuitive and modern dashboards as well as APIs and customized analytics. iSpot.tv has hundreds of brands and all major TV networks licensing its enterprise solution.

Kantar Balanced Attribution (BA)

Only 52% of global advertisers are confident their organization has the right balance between long-term brand building and short-term performance marketing. Balanced Attribution creates proprietary micro audiences that give a marketer fast activation on opportunities. Instead of a complex, expensive system, Balanced Attribution can be added to existing advertising effectiveness work to get results quickly.

Balanced Attribution applies granular, closed-loop optimization to both brand and sales lift goals by connecting brand, sales or behavioral metrics to individual ad exposures and optimizing execution. Working across channels and targets, Balanced Attribution helps marketers understand campaign performance and receive recommendations of how to achieve goals throughout the sales funnel.

Kantar Lift Insights (BLI)

Brand Lift Insights directly measures exposure to advertising across a single platform, while CrossMedia provides insights into media channel synergies. An industry leader in advertising effectiveness measurement, Kantar's offers allow marketers to optimize campaigns in-flight to maximize brand value. They provide in-flight campaign optimizations across all major platforms, including digital, mobile and TV, for optimal brand impact.

Available across all major platforms and media channels, results are compared to benchmarks from the industry's largest normative database and detailed audience performance profiles to illuminate who media is reaching and how effectiveness rates versus peers.

Holistic, consistent and transparent measurement of advertising effectiveness across all platforms, including social media platforms and walled gardens, is identified as a major challenge by 75% of the world's biggest advertisers. With the disappearance of the third-party cookie, Kantar has developed a combination of methodologies including direct integrations and extensively validated probabilistic measurement, heralding a new era for cross-publisher effectiveness. Kantar's Brand Lift Insights and CrossMedia offers help assess the entirety of campaigns from start to finish, and insights gained from these studies provide marketers the opportunity to understand brand impact across all types of media platforms and take action with confidence.

Kantar Total Marketing ROI (TMROI)

Total Marketing ROI (TMROI) provides a framework to measure and optimize effectiveness across all marketing channels, integrating sales and brand metrics into one predictive system, providing a more balanced approach to achieving short and long-term goals simultaneously.

Traditional Marketing Mix models measure the direct impact of marketing on sales (the short-term). But that is only half the picture. Investment in marketing impacts brand equity, and brand equity is a driver of sales. CMO's gain deeper validation of their marketing investment decisions through fast, quantifiable results that display a deeper contribution to the business through increased sales, demand, and shareholder value. Evidence of relative channel contribution provides an average improvement in marketing effectiveness of 10-20%.

TMROI also leverages creative quality scores from Kantar's AI-based creative scoring solution that has been built using our proprietary Creative Quality database with hundreds of thousands of campaigns. This delivers even more comprehensive insights on how advertising builds brand and sales.

LeadsRx

LeadsRx Attribution(tm) is a full-funnel attribution platform designed to help marketers optimize ad spend across all channels. Using the proprietary Universal Conversion Tracking Pixel(tm), LeadsRx Attribution offers fast on-boarding by using a single pixel that captures first-party data and self-learns about various marketing programs in play. The pixel does not rely on 3rd party cookies and captures digital ad performance, as well as broadcast advertising, podcasts, OTT, and offsite touchpoints from marketplaces, affiliates, and trusted marketing partners. LeadsRx Attribution is known for being extremely flexible and includes a variety of tuning parameters designed to help both agencies and brands get the most from attribution techniques.

Lucid

Powered by the direct connection to millions of survey respondents in the Lucid Marketplace, Impact Measurement enables marketers to survey consumers who have been exposed to a digital advertising campaign. Marketers have access to a real-time analytics dashboard to monitor daily survey results and proprietary brand lift metrics to inform media optimizations while a campaign is in-flight.

Lucid is a programmatic research technology platform that provides access to first-party survey data in over 100 countries. With its global community of sample buyers and suppliers, the Lucid Marketplace enables anyone, in any industry, to ask questions of online audiences and find the answers they need – fast. Founded in 2010, Lucid is headquartered in New Orleans, LA with offices throughout North America, EMEA, and APAC.

Marketing Evolution

Marketing Evolution provides the most comprehensive closed-loop marketing performance solution that increases campaign performance, sales, and engagement. Our privacy-preserving solution combines retrospective performance reporting, forward-looking optimization, and closed-loop activation of learning and earning in a single platform to maximize Marketing ROI and brand impact.

Merkle

Merkle launched Archie in 2018 as the latest branding of our marketing performance solution. Archie combines a standardized framework, a robust data integration platform, reporting templates and attribution extensions to provide a highly efficient marketing performance solution to clients.

Measurement in Archie is provided using Merkle's Connected Attribution framework, which is our unified measurement solution that started in 2013. This solution integrates multiple attribution models, including MMM, MTA and TV Attribution. Planning is supported through a Scenario Planning and Optimization tool.

Key features of the Archie platform include:

- Expandable brand and campaign reporting
- Cloud-based, for unlimited scalability
- Preconfigured, customizable, templates for core reporting and extensions.

Moat by Oracle Data Cloud

Moat Outcomes by Oracle Data Cloud is a marketing analytics and measurement platform focused on measuring attention, viewability, validity and brand safety in digital advertising. Working with publishers, brands, agencies and platforms, Moat is able to use data to help unlock hidden potential through actionable insights and drive overall better business outcomes.

In 2017, Oracle Data Cloud welcomed Moat into its powerful suite of advertising technology solutions. Together under one umbrella, Oracle Data Cloud offers the data and technology that helps you better understand your audience, where to engage them and how to measure it all with Moat.

NCS Sales Effect (SE)

NCSolutions' Sales Effect Studies measure the impact of your advertising. NCS connects advertising exposures to sales results to help CPG advertisers and publishers know the sales impact of their campaigns. With Sales Effect, you'll discover which campaign strategies contributed to sales lift and return on ad spend, giving you the deep insights you need as you plan your next campaign.

NCS Sales Lift Metrics (SLiM)

With NCSolutions' Sales Lift Metrics, harness incremental sales data powered by machine learning to dial up the very campaign tactics that are driving the highest return and dial down those that are producing lower incremental sales. Make the right changes to your campaigns to drive better outcomes by testing tactical campaign elements, so you can gain a true understanding of what drives sales and allocate spend based on these metrics.

Neustar

Neustar Unified Analytics weaves together the strategic cross-channel analytics of MMM with the real time, user-level insights of MTA to provide a connected analytics platform that delivers actionable recommendations that drive growth for your brand. This integrated solution provides marketers with an ability to quantify the true ROI of their marketing investments, all while controlling for the influence of other marketing and environmental factors. Leveraging Fabrick™, a consumer identity ecosystem, Neustar delivers user-level measurement across critical online and offline channels. This sustainable, privacy-first data foundation provides visibility into the walled gardens, linear and connected TV, mobile apps, desktop, and other digital channels threatened by the decline of third-party cookies and mobile ad IDs ("MAIDS").

The Unified Analytics solution is delivered via a browser-based UI that provides marketing performance reporting, customer journey analytics, and forward-looking scenario planning functionality, as well as automated, scheduled custom reporting delivery. In addition, marketers have access to our best-in-class consulting services team who guide them through the design, implementation, and adoption of results for optimal planning and campaign execution. Learn how your company can benefit from our Unified Analytics solution at https://www.home.neustar/customer-analytics/unified-marketing-analytics.

Nielsen

Campaign Lift is an A/B testing platform which measures the efficacy (lift) and efficiency (ROAS) of a treatment by comparing the effect of a group of test subjects against a set of control subjects. The platform is underpinned by cutting edge automation to provide best in class speed of delivery, as well as leading methodological solutions to bring superior data quality and reliability. There are two Nielsen lift solutions—Market Lift and Buyer Lift. Market Lift uses store level data as subjects within geographically bound regions (city, state, DMA, etc.) to form test and control markets. Market Lift is available in over 50 countries worldwide and works with either Nielsen CPG data or securely ingested client data provided for other industries. Buyer Lift uses Nielsen's premium data assets (i.e. Quotient, Argus, JDP) to measure persons-level based outcomes with granular media, audience and demographic insights. Our solution covers 70% of all media ad spend through exclusive premium data assets. Within Buyer Lift, we support basic Observational Measurement (average treatment effect of the treated) as well as Randomized Control Trial measurement (intent to treat). All Nielsen lift products support linear TV, desktop, mobile in-app, social, OTT, addressable, print and radio media types.

Samba TV

Samba TV is a data and analytics company providing essential television insights by leveraging the world's most comprehensive source of real-time viewership data across broadcast, cable TV, OTT and digital media. Through proprietary software embedded in over 35M smart TVs globally, and a fully owned end-to-end tech stack, Samba TV makes audiences more addressable and measurable, so that marketers can deliver the most accurate cross-screen campaigns and understand the true impact of their media investment. Visit samba.tv for more information, or reach out to info@samba.tv to speak with the Samba TV team.

TVSquared

TVSquared's ADvantage platform provides always-on, cross-platform measurement of campaign and impression delivery, including unduplicated reach, audience analytics and business outcomes. Leveraging the insights ensures that both the buy-side and sell-side generate the maximum return for their media investments, while also retaining and growing relationships with ROI-positive experiences. TVSquared is used by thousands of brands, agencies, publishers, MVPDs and DSPs in more than 70 countries.

Upwave (formerly Survata)

Upwave measures whether cross-channel brand campaigns work. We currently provide two types of metrics – Brand Lift and Targeting Verification.

Our Brand Lift metrics measure incremental change in critical KPIs like Awareness, Favorability, Consideration, Purchase Intent and Message Association. We're the only analytics company leveraging cut-level controls and daily reweighting to offer a real-time, extremely granular, brand incrementality dashboard. This is only possible because we're running tens of thousands of machine learning models in the cloud every night, constantly looking for campaign insights.

Our Targeting Verification metrics are the industry-first way to see behavioral on-target metrics for linear, CTV, addressable, and digital in one dashboard. We're not limited to syndicated behavioral and demographic on-target metrics, but rather can show the percentage of impressions reaching the brand's custom persona, by audience and by publisher.

Since we believe "better ingredients, better pizza," Upwave's campaign analytics utilize proprietary consumer attitudinal data from our own digital network of content-unlocking integrations, not from survey addicts on research panels. This provides us with the largest, most accurate, and most representative attitudinal dataset available.

We also built the brand measurement industry's first Google Campaign Manager API integration, so all campaign metadata is automatically imported to feed our machine learning models.

Veeva (Veeva Crossix)

A pioneer in patient data, privacy, and analytics, Veeva Crossix leverages the industry's most advanced technology to connect comprehensive health and non-health data, covering more than 300 million lives – all in a privacy-safe way. It delivers data and insights to over 200 brands from top 20 pharma companies as well as leading health systems, pharmacies, and wellness brands. Crossix DIFA is the market leading SaaS platform used by healthcare brands and agencies for measuring and optimizing healthcare marketing, across media channels. To learn more about Crossix, visit veeva.com/crossix.

III. PRODUCT CHARACTERISTICS

SECTION 1: PRODUCTS WHICH TYPICALLY USE SALES AS A DEPENDENT VARIABLE AND TYPICALLY INCORPORATE SURVEY DATA

	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Applications							
Ongoing measurement							
Campaign measurement							
Measure Impact of Media Activity							
Measure Impact of Marketing Activity							
Measure Contribution of creative							
In-campaign Tactical Optimizations of media and/or creative							
Other applications	*		*		*	*	*
Level of analysis typically conducted at							
Individual							
Household							
Device							
Store/Market							
Outcome metrics							
ROI							
ROAS							
Lift							
Incremental lift							
Others	*	*	*	*	*	*	

* See Section 1B, page 26

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Types of campaigns covered							
Digital only		■			■		
TV only		■			■		
TV and digital only	■	■			■		
TV, digital and other media, specifically:	■	■	■	■	■	■	■
Print	■		■			■	■
Radio/Audio			■	■		■	■
OOH			■		■	■	■
Direct Mail			■			■	■
Email			■		■	■	■
Cinema	■					■	■
OTT		■	■	■	■	■	■
Other media	■	*	*	*		*	*
National	■	■	■	■	■	■	■
Regional/Local	■	■	■	■	■	■	■
CPG	■	■	■	■	■	■	■
Pharma		■	■	■	■	■	■
Retail	■	■	■	■	■	■	■
Financial		■	■	■	■	■	■
E-commerce	■	■	■	■	■	■	■
Automotive	■	■	■	■	■	■	■
Other product categories	*	*	*	*	*	*	*
Dependent variables							
Chiefly sales	■	■	■	■	■	■	■
Others mentioned							
Web site visits	■	■	■		■	■	■
Searches						■	■
Store/location visits/foot traffic	■	■	■		■	■	■
Mobile app downloads		■			■		■
Revenue	■		■		■		■
Brand metrics (e.g., awareness, consideration, health)	■		■		■	■	■
Others		*	*	*	*	*	*

* See Section 1B, page 26-27

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Effects typically estimated							
Media							
Creative							
Seasonality							
Frequency							
Competitive marketing							
Others	*		*			*	*
Independent Variables Typically Included							
Weight of Each medium							
Probability of Exposure to Each medium							
Number of Exposures to Each medium							
Exposures to Other Media Beyond those client Focused on							
Creative							
Engagement with the brand							
Buying history							
Duration of exposure							
Demographics							
Geography							
Price							
Promotion							
Product distribution							
Others	*	*	*			*	*
Brand Tracking Metrics Typically Included							
Brand familiarity							
Brand favorability							
Brand consideration							
Purchase Intent							
Others	*	*	*	*	*	*	*

* See Section 1B, page 27

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Media typically work with in analyzing ROI/ROAS/Lift (green=alone, yellow= in combination with other media)							
Linear TV							
VOD							
Addressable TV							
Premium TV viewed on computer or mobile device							
OTT							
Print							
Static Out-of-home							
Digital Out-of-home							
Radio							
Other audio							
Search							
Mobile							
Online video							
Online display							
Paid social							
Walled gardens							
Other			*				*
Frequency of studies with . . .							
VOD	No estimate	Small but healthy percentage	25-50%	Less than 25%	Rare	No estimate	No estimate
Addressable TV	No estimate	Very small percentage	50-75%	Less than 25%	Less than 25%	No estimate	No estimate
OTT	No estimate	Majority	50-75%	Most	25-50%	No estimate	No estimate
Capable of analyzing these combinations in a single campaign							
Linear TV, VOD, OTT, Addressable							
Linear TV, VOD, OTT, Addressable, Premium TV viewed on computer or mobile phone							

* See Section 1B, page 28

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Level at which medium is measured: D=Device, P=Person, H=Household, A=Aggregate, O=Other							
Linear TV	D, H, A	D, P, H, A	H, A	D	P, H	D, P, H, A	H, A
VOD	D, H, A	D, P, H, A	D, H, A	D	P, H	D, P, H, A	H, A
Addressable TV	D, H, A	D, P, H, A	H, A	D	P, H	D, P, H, A	H, A
Premium TV viewed on computer or mobile device	D, H, A		D, H, A	A	P	D, P, A	D, H, A
OTT	D, H, A	D, P, H, A	D, P, H	A	P, H	D, P, H, A	D, H, A
Print			H, A			H, A	A
Static Out-of-home			A, O			D, P, A	A
Digital Out-of-home			A, O		D, P	D, P, A	A
Radio			H, A			P, A	A
Other audio			D, P, H, A	A	D, P	D, P, H, A	D, H, A
Search			D, P, H, A			D, P, A	D, H, A
Mobile	D, P, H, A	D, P, H, A	D, P, H, A		D, P, H	D, P, A	D, H, A
Online video	D, H, A	D, P, H, A	D, P, H, A	A	D, P, H	D, P, A	D, H, A
Online display	D, H, A	D, P, H, A	D, P, H, A		D, P, H	D, P, A	D, H, A
Paid social	D, H, A		D, H, A		D, P, H	D, P, A	D, H, A, O
Walled gardens	D, H, A		D, H, A		P, O	P, A	D, H, A, O
Other			D, P, H, A				D, H, A
Unit of Analysis Typically Analyzed							
Individual							
Household							
Cookie							
IP Address							
Device		*					
Store							
Market							
Other			*			*	

* See Section 1B, page 28

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Data sources used							
TV ad exposure files	■	■	■	■	■	■	■
Digital ad exposure files (i.e., cookie files)	■	■	■		■	■	■
Campaign log files	■	■	■	■	■	■	■
Viewability data		TV & Digital Video	Digital Video	TV	TV & Digital	Digital & OOH	
Subscriber files	■	■	■	■	■	■	■
Registration records	■	■	■	■	■	■	■
Loyalty card data	■	■	■	■	■	■	■
Store-level sales data	■	■	■	■	■	■	■
Credit card transaction files	■	■	■		■		
Consumer panels		■	■	■	■	■	■
Cross-sectional surveys	■	■	■	■	■	■	■
Other data sets	*	*	*			*	*
Additional variables typically included in analysis							
Other marketing factors	■	■	■		■	■	■
Other non-marketing factors	■	■	■		■	■	■
Seasonality	■	■	■	■		■	■
Weather			■			■	■
Other media	■	■	■			■	■
Use of control group to which exposed group is compared							
Always or almost always	■	■	■	■	■		
Sometimes						■	■

* See Section 1B, page 28

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Typically included in analysis							
Diminishing returns							
Baseline consumption, behavior or purchases							
Pre-campaign sales data							
Halo effects of sister brands							
Adstock							
Competitive activity							
Interactions/Synergies between media							
Time period for pre-campaign sales typically included	Prior 12 months or more per client direction	Varies a lot by vertical/ category. Typically a similar period as the campaign being measured.	Varies by industry due to factors such as purchase cycle, seasonality, etc. Average is 6-12 months.		Depends on the sales cycle of the product, generally up to 12 months or more	From beginning of implementation, Bayesian learning and forgetting process along with the time since treatment determines whether and just how relevant that pre-campaign information is. The learning algorithm that updates results offers a data driven way to determine the extent to which these historical marketing efforts are considered.	Typically 6 to 12 months, sometimes longer depending on the specific product's purchase cycle.
Use of experimental design							
Always/Usually							
Sometimes							
Experimental design typically employed							
Randomized control trials							
Ghost ads						(for search)	
Intent to treat							
Other design	*		*		*		

* See Section 1B, page 28

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Typically provided to clients							
Relative lifts within the test and control groups							
Estimated lifts among all exposed individuals or households in the target market							
Estimated lifts among all exposed individuals or households							
Baseline expected sales/visits/conversions /registrations/inquiries absent any media or advertising							
Estimates of media effects							
Estimates of creative effects							
Estimates of other factors	*				*		*
Key performance indicators used to judge validity of results	Continuous measurement; Stability across methods; Stability across sampling	Spike analysis along with drag factor analysis, explained further in Section 1B, page 28	From business perspective, validate against AP proprietary knowledge database. From analytical perspective, forward-looking predictive power, described further in Section 1B, page 28	Client campaign results. Did the campaign become more efficient, did response increase, etc. as predicted it would?	Use a Kantar tool called the Meaningfully Different Framework (MDF), which has been certified by the Marketing Accountability Standards Board (MASB), to align to in-market sales performance	Improvement of the KPI for in market testing of recommen-dations, against control condition of business as usual (or without solution based decisions); for further information on the KPIs, see Section 1B, page 28	A number of statistical validation metrics, such as MAPE for econometric time series models and ROC for binary logistic choice models. Model validations performed with out-of-sample data, employing k-fold cross-validation

* See Section 1B, page 28

Section 1, Continued	605	Alphonso	Analytic Partners	iSpot.tv	Kantar BA	Marketing Evolution	Neustar
Actions taken to validate results (Green=Always, Yellow=At least half the time)							
Cross-check internally to assure the accuracy of calculations							
Check results against Census data, when possible							
Compare conversion estimates to "downstream conversions" or increases in actual sales							
Compare results with other data streams, such as cross-sectional lift studies and longitudinal tracking studies							
Perform A/A testing of models to assess whether the model would measure a change in sales if there were completely random exposures to a campaign							
Use random control trials (in which a random, blinded portion of the target market receives PSAs or ghost ads instead of branded ads) to validate the models							
Compare models to results using synthetic data							
Typically analyze post-campaign data to assess actual results of campaign in the marketplace							

SECTION 1B: PRODUCTS THAT TYPICALLY USE SALES AS A DEPENDENT VARIABLE BUT DO NOT TYPICALLY INCORPORATE SURVEY DATA: OTHER PRODUCT ATTRIBUTES

	Other Applications
605	Context Optimization, Responsive Audiences
Analytic Partners	Strategic and Tactical scenario planning and optimization as well as overall forecasting and business planning.
Kantar BA	Creation of custom first-party audience targets
Marketing Evolution	Ongoing Optimization, Ongoing activation, Ongoing Test/Learn optimization, Analytics Ready Data provision, ongoing verification of data, ongoing validation of measurement and recommendation, Audience optimization and activation connect to buy
Neustar	Marketing scenario planning (simulations and optimizations)
	Other Outcome Metrics
605	Incremental sales; incremental sales by GRP; buying rate; penetration
Alphonso	Incremental reach; Frequency distribution; Creative Resonance (engagement of audience with creative); Cost per user acquired (cost per incremental purchase)
Analytic Partners	Effectiveness outcomes such as unit response per marketing exposure, incremental sales per exposure; new customer acquisition and cost per acquisition, brand health / equity-based outcomes.
iSpot.tv	Web Conversions, Web Orders, Ad Completions
Kantar BA	Brand lift, Visit (location) lift, TV tune-in, site visitation (online behavioral lift)
Mktg Evolution	Marginal return, Marginal Cost, Cost per Conversion, Proportion of Opportunity Captured
	Other Media covered in campaigns along with TV and Digital
Alphonso	Addressable
Analytic Partners	Addressable (OTT, CTV, OLV, OLA, Search, Social)
iSpot.tv	CTV, and we also, via a pixel, have visibility into any and all digital marketing effects (SEM, SEO, etc.)
Mktg Evolution	Call-center, store promo
Neustar	Whatever channel a client is using, including influencer media, mobile, CTV, addressable TV, SMS, circular, digital circular, sponsorships, event marketing, content marketing, mobile in-app, affiliates, paid search, paid social
	Other product categories covered
605	Any measured at household level, and data set that can be deterministically matched to 21M+ HHs
Alphonso	All categories
Analytic Partners	QSR, High Tech, Durables, Telco, Energy, Healthcare, Travel and Hospitality, Entertainment, B2B, Education, Non-Profit
iSpottv	Movie Studios
Kantar BA	All, incl. travel, Entertainment, Technology
Mktg Evolution	Software B2B, Telecom B2C & B2B, Entertainment
Neustar	Media & Entertainment, Travel and Hospitality, B2B, Internet & Online Services, Telecommunications/ CSP, Restaurants and QSR, Healthcare and Pharmaceuticals, Consumer Electronics

Section 1B continued	
	Other dependent variables
Alphonso	Mobile activity and transactions
Analytic Partners	Equivalized Volume, New Accounts, Appointment Requests, Enrollment, Subscriptions, Inquiries, Installs, Money Movements
Kantar BA	Brand attributes
iSpot.tv	Campaign Level Lift/Incrementality, Network Lift/Incrementality, Daypart Lift/ Incrementality
Mktg Evolution	Sign-ups, Relationships: Upgrades/ Downgrades/ Discontinues
Neustar	Word of mouth, any conversion metric with data available
	Other effects typically estimated
605	Target Segment, Optimization of program context effects upon advertising effectiveness measures. Synergy between creative, paid and owned and earned, advertising and promotion, and inter-combinations thereof.
Analytic Partners	Marginal response curves, Platform, Publisher, Campaign Themes; absolute price and price gaps; the impact of product offerings, variety, point of sales store characteristics, exogenous such as weather events, endemic / pandemic effects (e.g. Flu Incidence, Covid-19), consumer shifts, and macroeconomic (e.g., governmental policy changes, currency fluctuations).
iSpot.tv	TV's lift on digital marketing channels
Marketing Evolution	Person response heterogeneity, person state dependence/ behavioral cadence, exposure sequence effects, reach curve, search path, cross-vertical exposure probability. Note on person state/dependence/behavioral cadence: Directly observable effects on consumer decisions include previous behaviors and timing and frequency of them. The marketing science literature generally refers to these effects in consumer decision models as state dependence and relates it to habit formation, persistence, and decision inertia. As humans are creatures of habit these effects tend to be large and correlated with media exposure.
Neustar	Competition, economy, seasonality, brand, product quality, product launches, online buzz, web/store traffic, weather, one-time events, industry trends, price, promotion , inventory, distribution, customer service .
	Other Independent Variables Typically Included
605	Psychographics (RMT Driver-Tags™), 605 Viewer-graphics
Alphonso	Recency of exposure, creative type (ad with an offer or not, etc.)
Analytic Partners	Store Satisfaction Surveys, Product Assortment (Depth and Breadth of Variety), Labor Hours, Store Attributes (size, age etc.), Competitive efforts, Price/Promo gaps, App Rankings, Shopper Marketing, Custom Audited Point of Purchase execution, Macroeconomic (e.g., Consumer Sentiment, Gas Prices, New Housing Starts), Seasonal Flu Index, Human Mobility Index etc.
Marketing Evolution	Reach, Time since each: touch, action, exposure, coordinate distance; probability of exposure to audience/ micro-segment, market fixed effects, individual mixed effects
Neustar	Competition, economy, seasonality, brand, product quality, product launches, online buzz, web/store traffic, weather, one-time events, industry trends, etc.
	Other Brand Tracking Metrics Typically Included
605	Saliency (First Brand Mention), Responsiveness (Elasticity)
Analytic Partners	Net Promoter Score, Brand Affinity, Usage, Service Satisfaction, Owner Opinion (Automotive), Uniqueness, Awareness
Alphonso	Pre-exposure purchase behavior
iSpottv	Integration with Dynata to connect how TV impacts traditional brand funnel metrics
Kantar BA	Message association, ad awareness, brand attributes, and any custom metrics
Mktg Evolution	Brand awareness, whatever matters to client's business or objectives
Neustar	Brand attributes

Section 1B continued	
	Other Media Work With in Analyzing ROI/ROAS/Lift
Analytic Partners	Owned Media properties, Email, In-Store Media, Influencer activity, Word of Mouth, Affiliate marketing
Neustar	Owned media channels, in-store associate and affiliate engagement
	Other Unit of Analysis Typically Analyzed
Alphonso	"Device" includes both (1) mobile device id and (2) TV device id
Analytic Partners	Personas, customer segments
Mktg Evolution	Buying center: in the B2B cases such as software or telecom
	Other Data Sources Used
605	Political records, Store Visitation, Website Visitation & anything that can be matched
Alphonso	Demographic data, airings data, spend data, store visit data, SKU level purchase, pharma data, matched data from Experian/ Liveramp/third parties, website pixel, OTT pixel
Analytic Partners	Client 1st Party data including CRM data, Customer Data Platforms (CDPs), DMPs, DSPs
Mktg Evolution	Client CRM
Neustar	Customer-level transaction files, direct mail files, email files, web log files, and server log files
	Other experimental designs employed
605	Placebos, Advertiser Coop (Swap Placebos)
Analytic Partners	For aggregate data, a multicell design; for user level data, Randomized Control Trials
Kantar BA	Other approaches include proprietary "twinning" approach
Mktg Evolution	Ghost ads for search
	Estimates of Other Factors Typically Provided to Clients
605	Target Segment effects, context effects, synergy effects
Kantar BA	Audience target effects. Create deep micro segment impacts which can be used as seeds for custom first-party targets as well as predictive optimization scenarios.
Neustar	All other endogenous and exogenous control factors, targeting effects
	Detail on Key performance indicators used to judge validity of results
Alphonso	Drag factor analysis is used to understand what percentage of the consumer response (conversion) is immediate vs. delayed (a much longer time period). For certain categories, the response is more immediate (direct response) vs for others, the response is delayed (Ex: Autos).
Analytic Partners	One key forward-looking performance indicator is the model hold-out robustness. For time series, econometric based models, we compare model fit metrics (e.g. R2 and MAPE, Durbin-Watson) and perform hold-out and cross-validation tests such as RMSE and Hold-out MAPEs to ensure model insights hold well beyond initial model training period.
Marketing Evolution	KPIs: Marginal revenue to Marginal cost ratios in: conversion, sales, web visits, brand affinity, awareness, consideration, advocacy. Also monitor amount of opportunity achieved with a program evaluation framework that assesses how much better one could have done in hindsight. The better the grade gets, the greater the validity of the results.

SECTION 2: PRODUCTS THAT TYPICALLY USE SALES AS A DEPENDENT VARIABLE BUT DO NOT TYPICALLY INCORPORATE SURVEY DATA

	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Applications										
Ongoing measurement	■	■	■	■	■	■	■		■	■
Campaign measurement	■	■	■	■	■	■	■	■	■	■
Measure Impact of Media Activity	■	■	■	■	■	■	■	■	■	■
Measure Impact of Marketing Activity	■	■	■	■	■	■		■	■	■
Measure Contribution of creative	■	■	■	■	■	■	■	■	■	■
In-campaign Tactical Optimizations of Media and/or Creative	■	■	■	■	■	■	■		■	■
Other applications		*	*							
Level of analysis typically conducted at										
Individual	■	*			■	■	■	■	■	■
Household	■	■	■			■	■	■	■	■
Device		*				■		■	■	■
Store/Market			■	■	■	■				■
Outcome metrics										
ROI	■	■	■	■	■	■	■	■		■
ROAS	■	■	■	■	■	■	■	■		■
Lift	■	■	■		■		■	■	■	■
Incremental lift	■	■	■	■			■	■	■	■
Others		*	*		*	*				*

* See Section 2B, page 36

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Types of campaigns covered										
Digital only		■	■				■	■	■	■
TV only		■	■					■	■	■
TV and digital only		■	■					■		■
TV, digital and other media, specifically:	■	■	■	■	■	■		■		■
Print				■	■			■		■
Radio/Audio				■	■			■		■
OOH			■	■	■					■
Direct Mail	■		■	■	■					■
Email	■		■	■	■					■
OTT	■	■	■	■	■					■
Other media	*	*	*	*	*					*
National	■	■	■	■	■	■	■	■	■	■
Regional/Local		■	■	■	■	■	■			■
CPG	■	■	■	■	■	■	■	■	■	■
Pharma	■	■	■	■	■	■				■
Retail	■	■	■	■	■	■	■			■
Financial	■	■	■	■	■	■	■			■
E-commerce	■	■	■	■	■	■	■	■	■	■
Automotive	■	■		■	■	■	■			■
Other product categories	*			*	*			*		*
Dependent variables										
Predominantly sales	■	*	■	*	■	■	■	■	■	■
Others mentioned										
Web site visits	■	■		■						■
Searches	*	■								
Store/location visits/traffic	*	■		■			■			
Mobile app downloads	*	■								
Revenue	*	■		■						
Brand metrics (e.g., awareness, consideration, health)	■			■						
Others		*		*						*

* See Section 1B, pages 38-39

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Effects typically estimated										
Media										
Creative										
Seasonality										
Frequency										
Competitive marketing										
Other	*		*							*
Independent variables typically included										
Weight of Each medium										
Probability of Exposure to Each Medium										
Number of Exposures to Each Medium										
Exposures to Other media Beyond those Client focused on										
Creative										
Engagement with the brand										
Buying history										
Duration of exposure										
Demographics										
Geography										
Price										
Promotion										
Product distribution										
Others			*		*					
Brand tracking metrics typically included										
Brand familiarity										
Brand favorability										
Brand consideration										
Purchase Intent										
Others	*		*							

* See Section 2B, page 39

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Media typically work with in analyzing ROI/ROAS/Lift (green=alone, yellow= in combination with other media)										
Linear TV										
VOD										
Addressable TV										
Premium TV viewed on computer or mobile device										
OTT										
Print										
Static Out-of-home										
Digital Out-of-home										
Radio										
Other audio										
Search										
Mobile										
Online video										
Online display										
Paid social										
Walled gardens										
Other			*		*					
Frequency of studies with . . .										
OTT	Some	Over 50%	15% / 50% in combination with digital	Not typical		No estimate	2-5%	Usually, with other media	Usually, with other media	50-70% (for advert-isers)
VOD		Over 50%	65% of video campaigns	Not typical		No estimate		Usually, w/ other media	Usually, w/ other media	50-70% (for advert-isers)
Addressable TV	Most	Over 50%	15% / 25% in combination with digital	Not typical		No estimate		Most common	Most common	25%

* See Section 2B, page 39

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	Leads Rx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Linear TV, VOD, OTT										
Linear TV, VOD, OTT, Addressable, Premium TV viewed on computer or mobile phone										
Level at which medium is measured: D=Device, P=Person, H=Household, A=Aggregate, O=Other										
Linear TV		D, H, A	D, P, H, A, O	A	P, A	A		P, H		P, H, A, O
VOD		D, H, A	D, P, H, A, O	A		D		H		P, H, A, O
Addressable TV	H	H	D, P, H, A, O	A		P, H		H		P, H, A, O
Premium TV viewed on computer or mobile device		D, P, H	D, P, H, A, O	A	O	D		D, P, H		D. P, H, A, O
OTT	P, H	D, P, H	D, P, H, A, O	A		D, P	H	D, P, H		D. P, H, A, O
Print	P, H		D, P, H, A, O	A	P, A	H, A		H		P, H, A, O
Static Out-of-home			D, P, H, A, O	A		A				P, H, A, O
Digital Out-of-home	O	A	D, P, H, A, O	A		A		D, P, H		P, H, A, O
Radio			D, P, H, A, O	A	P, A	A		P, H		P, H, A, O
Other audio	O		D, P, H, A, O	A	P, A	D, A	H	D, P, H		P, H, A, O
Search	P, H	D, P, H	D, P, H, A, O	A	P, A	D, P, H, A		D, P, H		D. P, H, A, O
Mobile	P, H	D, P, H	D, P, H, A, O	A	P, A	D, P, H, A	H	D, P, H	D, P, H	D. P, H, A, O
Online video	P, H	D, P, H	D, P, H, A, O	A	P, A	D, P, H, A	H	D, P, H	D, P, H	D. P, H, A, O
Online display	P, H	D, P, H	D, P, H, A, O	A	P, A	D, P, H, A	H	D, P, H	D, P, H	D. P, H, A, O
Paid social	P, H	D, P, H	D, P, H, A, O	A	P, A	D, P, H, A	H	P, H		D. P, H, A, O
Walled gardens	P, H		D, P, H, A, O		P, A	P, H, A	H	D, P, H		D. P, H, A, O
Other			D, P, H, A, O		P, A					
Unit of Analysis Typically Analyzed										
Individual										
Household										
Cookie										
IP Address										
Device										
Store										
Market										

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Data sources used										
TV ad exposure files										
Digital ad exposure files (i.e., cookie files)										
Campaign log files										
Viewability data		TV/Video, Digital Display	Rare			Digital video, Display	Digital	Digital		
Subscriber files										
Registration records										
Loyalty card data										
Store-level sales data										
Credit card transaction files										
Consumer panels										
Cross-sectional surveys										
Other data sets	*	*	*		*			*	*	
Additional variables typically included in analysis										
Other marketing factors										
Other non-marketing factors										
Seasonality										
Weather										
Other media										
Use of control group to which exposed group is compared										
Always or almost always										
Sometimes										

* See Section 2B, page 40

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Moat	Merkle	NCS SE	NCS SLiM	Nielsen
Typically included in analysis										
Diminishing returns										
Baseline consumption, behavior or purchases										
Pre-campaign sales data										
Halo effects of sister brands										
Adstock										
Competitive activity										
Interactions/Synergies between media										
Time period for pre-campaign sales typically included	Highly dependent upon category; variable based on client needs / requests.	Highly dependent on the sales cycle of the brand/ vertical and the conversion window being used. It will be between 90 days and 12 mos.	Prior 52 weeks	Depends on the product purchase cycle.	Flexible window the user can set but typically offer 2, 4, 6, and 8 week periods.	Five quarters of pre-spend prior to the campaign	Depends on availability on the client side, but typically use 2-3 years of data. in some cases, need to use a shorter time period (i.e. 1 year)	One year	One year	52 weeks
Use of experimental design										
Always/Usually										
Sometimes										
Experimental design typically employed										
Randomized control trials										
Ghost ads										
Intent to treat										
Other design	*	*	*			*	*	*		

* See Section 2B, page 40

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Typically provided to clients										
Relative lifts within the test and control groups										
Estimated lifts among all exposed individuals or households in the target market										
Estimated lifts among all exposed individuals or households										
Baseline expected sales/ visits/conversions/regist rations/inquiries absent any media or advertising										
Estimates of media effects										
Estimates of creative effects										
Estimates of other factors		*	*		*			*		
Key performance indicators used to judge validity of results	Statistical probability, Historical ROI / ROAS, Alignment with client customer sales		Define test and control using three matching variables described in Table 2B, page 41	Ongoing longitudina l tracking of sales and brand equity used to evaluate impact on the brands over time.	Increased returns clients achieve when implementi ng the attribution insights provided	Vary by client, typically focused on changes in business outcomes (such as sales, leads, conversion s, Rx, site visits, etc.)	An automated QC process described in Table 2B, Page 41	Results are compared to a normative database of all results by brand, category and media, described further in Table 2B, Page 41	Ongoing measure- ment is compared to final total campaign measure- ment; for more detail on metrics, see Table 2B, Page 41	

* See Section 2B, page 40

Section 2, continued	Acxiom	Data Plus Math	IRI	Kantar TMROI	LeadsRx	Merkle	Moat	NCS SE	NCS SLiM	Nielsen
Actions taken to validate results (Green=Always, Yellow=At least half the time)										
Cross-check internally to assure the accuracy of calculations										
Check results against Census data, when possible										
Compare conversion estimates to "downstream conversions" or increases in actual sales										
Compare results with other data streams, such as cross-sectional lift studies and longitudinal tracking studies										
Perform A/A testing of models to assess whether the model would measure a change in sales if there were completely random exposures to a campaign										
Use random control trials (in which a random, blinded portion of the target market receives PSAs or ghost ads instead of branded ads) to validate the models		*								
Compare models to results using synthetic data										
Typically analyze post-campaign data to assess actual results of campaign in the marketplace										

* See Section 2B, page 41

SECTION 2B: PRODUCTS THAT TYPICALLY USE SALES AS A DEPENDENT VARIABLE BUT DO NOT TYPICALLY INCORPORATE SURVEY DATA: OTHER PRODUCT ATTRIBUTES

	Other Applications
Data Plus Math	Reach, frequency, impressions and response by customized audience
IRI	Multi-Touch Attribution across marketing touchpoints/channels (i.e. Digital, TV, Out of Home)
	Note on Level of Analysis Typically Conducted
Data Plus Math	Available at individual and device level
	Other Outcome Metrics
Data Plus Math	Cross-screen Reach & Frequency
IRI	Penetration, Occasion, $ per Occasion, $ Per HH
LeadsRx	Conversion Rate, Cost per Conversion, Attributed Revenue
Merkle	CPC, CPV
Nielsen	Impact on brand penetration, buy rate, purchase frequency and purchase size
	Other Media covered in campaigns along with TV and Digital
Acxiom	Visitation of advertiser's website, social, mobile, out-bound tele-marketing
Data Plus Math	CTV
IRI	Across any channel that provides exposure data that can be tied back to a household
Kantar TMROI	Any person or household-based level format
LeadsRx	A broad range of marketing programs, including retail, mobile, events, tradeshows, and other offline marketing programs
Nielsen	SVOD
	Other product categories covered
Acxiom	Healthcare, in addition to Pharma Manufacturers, Non-Profits, Travel, Utilities
Kantar TMROI	Travel, Entertainment, Technology or any other category
LeadsRx	Nearly every vertical in both B2C and B2B product categories.
Nielsen	Travel, entertainment, restaurants, electronics

Section 2B continued	
	Other dependent variables
Acxiom	May include searches, store visits/traffic, mobile app downloads, revenue as long as the client can provide the data
Data plus Math	Configurable depending on vertical/brand
Kantar TMROI	Leads, RFQs, appointments etc.
Nielsen	Has the ability to ingest 1st party client supplied data and do measurement for other dependent variables.
	Other effects typically estimated
Acxiom	Audience selection (targeting)
IRI	Brand and Category Effects, Consumer Diagnostics (Buyer Classification, Trial & Repeat)
Nielsen	Trade, pricing, promotion, etc.
	Other Independent Variables Typically Included
IRI	Causal data (in-store data such as feature inserts (e.g., in newspapers), end-of-aisle display, temporary price reduction and coupons), point of sale (POS) data, in store promotion, and Experian Consumer View data.
LeadsRx	Device, Browser, Operating System, Daypart, Hour of the day, Day of week, Week of year, Station Format/Ownership
	Other Brand Tracking Metrics Typically Included
Acxiom	Awareness, Message Recall, Consideration, Likeability, Intent to Purchase
IRI	Brand Switching, Category Buyers, Brand Buyers, Lapsed Buyers
	Other Media Work With in Analyzing ROI/ROAS/Lift
IRI	Any media type if there is exposure data that can be connected to a household
LeadsRx	Advertorials (Taboola, Outbrain), Email

Section 2B continued	
	Other Data Sources Used
Acxiom	Campaign History files (can be the initial audience from the advertiser, the onboarded audience or the distributed audience, depending on the medium/publisher.
Data Plus Math	Location data
IRI	Causal data, point of sale (POS) data, and Experian Consumer View data
LeadsRx	Can work with all types of marketing data depending on the client's needs and marketing technology stack. Their Open Attribution API allows for marketers to pass marketing data to LeadsRx via their customer applications. Their CSV file ingest capability allows for LeadsRx to bring in marketing data from events, sales meetings, foot traffic or anything else that can be formatted into a CSV file. Basic method of data collection is based on proprietary, Universal Conversion Tracking Pixel™ which collects extensive information about website visitors.
NCS SE	Census
NCS SLiM	Census
	Other experimental designs employed
Acxiom	Factorial / Fractional Factorial Designs
Data Plus Math	Synthetic control; not a pre-established control cell. Intent to treat for addressable
IRI	Hold Out, Forensic Control
Merkle	Many types: random control, matched market, etc.
Moat	Use publisher's experimental framework to build control group, if publisher has set one up, but still use forensic control algorithm for a number of different reasons.
NCS SE	Depends on the publisher; use RCT and ITT when requested by the publisher.
	Estimates of Other Factors Typically Provided to Clients
Data Plus Math	Different media and creative effects by Audience
IRI	Any element within a media plan (i.e. publisher, target, ad placement, etc.) if it meets statistical significance.
LeadsRx	Up to five custom dimensions in campaigns. These parameters are set by the marketer and may include campaign, creative, offer, code, toll free number, media and other metrics.
NCS SE	Competitive share shift, drivers of lift (basket, penetration, buy-rate)

Section 2B continued	
	Detail on Key performance indicators used to judge validity of results
IRI	Process for defining test and control, IRI uses three different matching variables: • ProScore: A propensity distribution metric, containing over 2000 variables (e.g. income, age, gender etc.) that looks at 52 weeks of data grouping each household into deciles • Pre-Campaign: Compares category and product Penetration, Trips and Purchases vs. the same time year ago completed for each timeframe read controlling for seasonality • Retailer Distribution: Adjusts for assortment and promotional differences For every exposed household, we match against the variables above and bucket for the total control, which ensures matching precision. An additional metric we look at for validation are performing AA tests (whereas a typical Lift study is an AB test) on subsets of both test and control data to understand if any bias was introduced into the dataset via the matching and modeling process.
Moat	An automated QC process that measures 20+ variables on every campaign that is measured --including, but not limited to, balance between exposed and control across independent variables, model performance, data coverage, etc. Process assesses whether the distribution of forensic control is in line with the exposed audience for various metrics including demographics and pre-spend variables. This metric summarizes percent of quantiles that are statistically significantly different when comparing the exposed distribution to the forensic control distribution. (Data coverage relates to QC checks on the amount of transaction data received for each analysis as well as timeseries plots to surface any abnormalities in the data.) Additionally, Moat estimates the power of each analysis to ensure that sample is large enough to detect different magnitudes of lift.
NCS SE	Where possible, the results are compared to mix and MTA results. Key metrics: ROAS, Total Incremental Sales, Incremental #/exposed HH, Incremental Sales per thousand exposures.
NCS SLiM	Key metrics: ROAS, Total Incremental Sales, Incremental #/exposed HH, Incremental Sales per thousand exposures.
	Note on Actions Taken to Validate Results
Data Plus Math	Random Control Trials done to validate models for addressable

SECTION 3: PRODUCTS THAT TYPICALLY USE A DEPENDENT VARIABLE OTHER THAN SALES AND TYPICALLY INCORPORATE SURVEY DATA

	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Applications						
Ongoing measurement		■	■	■	■	■
Campaign measurement	■	■	■	■	■	■
Measure Impact of Media Activity	■	■	■	■	■	■
Measure Impact of Marketing Activity	■			■	■	■
Measure Contribution of creative	■	■	■	■	■	■
In-campaign Tactical Optimizations of media and/or creative	■	■	■	■	■	■
Other applications						
Level of analysis typically conducted at						
Individual	■	■	■	■	■	■
Household	■	■		■		
Device	■	■	■	■		
Store/Market				■		
Outcome metrics						
ROI			■	■		
ROAS			■	■		
Lift	■	■	■	■	■	■
Incremental lift		■	■	■	■	■
Others			*			

* See Section 3B, page 51

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Types of campaigns covered						
Digital only	■	■	■	■	■	■
TV only	■	■	■	■	■	■
TV and digital only	■	■	■	■	■	■
TV, digital and other media, specifically:	■	■	■	■	■	■
Print	■	■	■	■	■	
Radio/Audio	■	■	■	■	■	■
OOH	■	■	■	■	■	
Direct Mail	■					
Email	■					
Cinema	■	■	■	■	■	
OTT	■	■	■			■
Other media	■	■	■	■	■	■
National	■	■	■	■	■	■
Regional/Local	■	■	■	■	■	■
CPG	■	■	■	■	■	■
Pharma	■	■	■	■	■	■
Retail	■	■	■	■	■	■
Financial	■	■	■	■	■	■
E-commerce	■	■	■	■	■	■
Automotive	■	■	■	■	■	■
Other product categories	*	*	*	*		
Dependent variables						
Sales (capable of incorporating as client sales data)			*	■	■	■
Others mentioned						
Web site visits						
Searches						
Store/location visits/foot traffic			■	■		
Mobile app downloads						
Revenue			■			
Brand metrics (e.g., awareness, consideration, health)	■	■	■	■	■	■
Others		*		*	*	

* See Section 3B, page 51

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Effects typically estimated						
Media						
Creative						
Seasonality						
Frequency						
Competitive marketing						
Other	*		*	*		*
Independent variables typically included						
Weight of Each medium						
Probability of Exposure to Each Medium						
Number of Exposures to Each Medium						
Exposures to Other media beyond those client focused on						
Creative						
Engagement with the brand						
Buying history						
Duration of exposure						
Demographics						
Geography						
Price						
Promotion						
Product distribution						
Others		*	*			
Brand tracking metrics typically included						
Brand familiarity						
Brand favorability						
Brand consideration						
Purchase Intent						
Others	*	*		*	*	*

* See Section 3B, pages 51-52

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Media typically work with in analyzing ROI/ROAS/Lift (green=alone, yellow= in combination with other media)						
Linear TV						
VOD						
Addressable TV						
Premium TV viewed on computer or mobile device						
OTT						
Print						
Static Out-of-home						
Digital Out-of-home						
Radio						
Other audio						
Search						
Mobile						
Online video						
Online display						
Paid social						
Walled gardens						
Other						
Frequency of studies with . . .						
OTT	76%; 98% of the time with other media	No estimate	No estimate	30-40%	75% - 90% of the time with other media	55% of all campaigns, 45% of all campaigns in combo with other media
VOD		No estimate	No estimate	Less than 10%	50% - 90% of the time with other media	About 25% (rough guess)
Addressable TV		No estimate	No estimate	20%, rarely in combination with other media	5%	5% of all campaigns, 2% of all campaigns in combo with other media

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Capable of analyzing these combinations in a single campaign						
VOD, OTT, Addressable, Premium TV viewed on computer or mobile phone						
Linear TV, VOD, OTT, Premium TV viewed on computer or mobile phone						
Linear TV, VOD, OTT, Addressable, Premium TV viewed on computer or mobile phone						
Level at which medium is measured: D=Device, P=Person, H=Household, A=Aggregate, O=Other						
Linear TV	H	A	P	P, H	P	P
VOD	H	A	P	P, H	P	P
Addressable TV		A	P	P, H	P	P
Premium TV viewed on computer or mobile device	P	A	P	P, H	P	P
OTT	H	A	P	P, H	P	P
Print	P	A	P	P	P	
Static Out-of-home		A	P	P	P	
Digital Out-of-home		A	P	D, P	P	
Radio	P	A	D	P	P	
Other audio	P	A	P	P	P	P
Search			P			
Mobile	P	A	P	D, P	P	P
Online video	P	A	P	D, P	P	P
Online display	P	A	P	D, P	P	P
Paid social	P	P	P	P		
Walled gardens	P	A	D	P		P
Other						
Unit of Analysis Typically Analyzed						
Individual						
Household						
Cookie						
IP Address						
Device						
Store						
Market						

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Data sources used						
TV ad exposure files						
Digital ad exposure files (i.e., cookie files)						
Campaign log files						
Viewability data	Display & video on mobile & PC		TV, Digital if client provides	Digital and TV	Digital	Digital display
Subscriber files				*		
Registration records						
Loyalty card data						
Store-level sales data						
Credit card transaction files						
Consumer panels						
Cross-sectional surveys						
Other data sets	*	*			*	
Additional variables typically included in analysis						
Other marketing factors						
Other non-marketing factors						
Seasonality						
Weather						
Other media						
Use of control group to which exposed group is compared						
Always or almost always						
Sometimes						

* See Section 3B, page 52

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Typically included in analysis						
Diminishing returns						
Baseline consumption, behavior or purchases						
Pre-campaign sales data						
Halo effects of sister brands						
Adstock						
Competitive activity						
Interactions/Synergies between media						
Time period for pre-campaign sales typically included				.		
Use of experimental design						
Always/Usually						
Sometimes						
Experimental design typically employed						
Randomized control trials						
Ghost ads						
Intent to treat						
Other design		*		*		*

* See Section 3B, page 52

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Typically provided to clients						
Relative lifts within the test and control groups						
Estimated lifts among all exposed individuals or households in the target market						
Estimated lifts among all exposed individuals or households						
Baseline expected sales/ visits/ conversions/ registrations/ inquiries absent any media or advertising						
Estimates of media effects						
Estimates of creative effects						
Estimates of other factors		*	*	*		
Key performance indicators used to judge validity of results	Comscore norms	Employ a norms database and outlier analyses	Continuously monitor distribution of visitation and incrementality measured across the 1000's of campaigns, as described in Table 3B, page 52	Lift results are compared to normative data from Kantar's immense MarketNorms database of hundreds of thousands of campaigns that span verticals and countries. For additional KPIs, see Table 3B, page 52	Evaluates historical performance of campaigns based on benchmark, provides comparison to brand tracking results, validates results against third parties; for more detail, see Table 3B, page 52	AUC and ROC metrics

* See Section 3B, page 52

Section 3, Continued	Comscore	Dynata	Foursquare	Kantar BLI	Lucid	Upwave
Actions taken to validate results (Green=Always, Yellow=At least half the time)						
Cross-check internally to assure the accuracy of calculations						
Check results against Census data, when possible						
Compare conversion estimates to "downstream conversions" or increases in actual sales						
Compare results with other data streams, such as cross-sectional lift studies and longitudinal tracking studies						
Perform A/A testing of models to assess whether the model would measure a change in sales if there were completely random exposures to a campaign						
Use random control trials (in which a random, blinded portion of the target market receives PSAs or ghost ads instead of branded ads) to validate the models						
Compare models to results using synthetic data						
Typically analyze post-campaign data to assess actual results of campaign in the marketplace						

SECTION 3B: PRODUCTS THAT TYPICALLY USE A DEPENDENT VARIABLE OTHER THAN SALES AND TYPICALLY INCORPORATE SURVEY DATA: OTHER PRODUCT ATTRIBUTES

	Other Outcome Metrics
Foursquare	Store visits and derived metrics
	Other Media covered in campaigns along with TV and Digital
Dynata	Addressable, Streaming Video & Audio
Foursquare	Audio (streaming, terrestrial), CTV, addressable; digital includes display, video, and search.
Kantar BLI	Custom
Lucid	Podcasts, Gaming
Upwave	Digital audio
	Other product categories covered
Comscore	Travel, political
Dynata	Can measure campaigns from any industry
Foursquare	Any other categories with businesses having physical locations (QSR, tourism, theatrical, and more)
Kantar BLI	Covers all categories
	Sales as dependent variable
Foursquare	Offer capability for clients to do on own
	Other dependent variables
Dynata	Any other custom variables desired.
Kantar BLI	Digital behavior.
Lucid	Advertising & message recall
	Other effects typically estimated
Comscore	Publisher, placement
Foursquare	Publisher, media partner
Kantar BLI	Audience demographic / targets
Upwave	Channel, demographics
	Other Independent Variables Typically Included
Dynata	Placement/Targeting, Site/Network/Publisher
Foursquare	Seasonality

Section 3B continued	
	Other Brand Tracking Metrics Typically Included
Comscore	Attribute recall, message association
Dynata	Awareness, Ad Awareness, Brand Recommendation, Message Linkage
Kantar BLI	Brand Awareness Message Association, Ad Awareness, Brand Attributes and any custom metrics
Lucid	Advertising Recall, Purchase Consideration, Brand Awareness, Unaided Awareness, Product Interest, and many others.
Upwave	Ad recall, brand message association, awareness
	Other Data Sources Used / Notes on Data Sources
Comscore	Video ad exposure via content recognition technology, Set Top Box data
Dynata	Clean room partnership impressions (e.g., Amazon S2, Google Ads Data Hub)
Kantar BLI	Note: Subscribers files for some TV partnerships
Lucid	Lucid is integrated with several data platforms and identity vendors to ingest customer data as well as data from third parties. This is used to qualify surveys as well as provide additional layers of insight on the incremental impact of a campaign on consumer behavior and customer sales.
	Other experimental designs employed
Dynata	Forced exposure
Kantar BLI	Estimates of publisher effects; estimates of frequency & latency effects, multi-touch attribution, attribute driver analysis.
Upwave	Exposed (measured via tag) vs. synthetic control (not RCT)
	Estimates of Other Factors Typically Provided to Clients
Dynata	Estimates of publisher effects; estimates of frequency & latency effects, multi-touch attribution, attribute driver analysis.
Foursquare	Any media tactic cut provided by a client
Kantar BLI	Audience targets
	Detail on Key performance indicators used to judge validity of results
Foursquare	Continuously monitor the distribution of visitation and incrementality measured across the 1000's of campaigns that are run on a daily basis. The monitoring focuses on the 90th, 50th & 10th percentile of measurement across the population of campaigns. Bounds derived from historical levels are used to monitor for deviation and alert the engineering team when necessary.
Kantar BLI	Additional KPIs such as confirming reach and frequency estimates for validity, confirming key metrics for campaign measurement are moving in expected direction, and trending analysis of KPIs over time.
Lucid	Evaluates lift over time, as well as historical performance of campaigns based on benchmarks. Also provides comparison to brand tracking results to validate against third-party tracking studies. For audience or incidence studies, Lucid has typically validated results against MRI/Simmons and other third parties used in academic research (i.e., Mechanical Turk). Also maintains a Supply Quality Program that looks at the overall consistency, acceptance and attentiveness of suppliers. Lucid enforces a strict whitelist and allocations process for studies to ensure the respondents are sourced based on these quality standards.

SECTION 4: PRODUCTS THAT TYPICALLY USE A DEPENDENT VARIABLE OTHER THAN SALES AND TYPICALLY DO NOT INCORPORATE SURVEY DATA

	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Applications							
Ongoing measurement							
Campaign measurement							
Measure Impact of Media Activity							
Measure Impact of Marketing Activity							
Measure Contribution of creative							
In-campaign Tactical Optimizations of media and/or creative							
Other applications	*	*		*	*	*	*
Level of analysis typically conducted at							
Individual							
Household							
Device							
Store/Market							
Outcome metrics							
ROI							
ROAS							
Lift							
Incremental lift							
Others	*	*	*	*	*	*	*

* See Section 4B, page 62

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Types of campaigns covered							
Digital only			■		■	■	
TV only			■		■	■	
TV and digital only			■		■	■	■
TV, digital and other media, specifically:	■	■	■	■	■	■	
Print			■		■		
Radio/Audio	■	■	■		■		
OOH			■	■	■		
Direct Mail		■	■		■		
Email		■	■		■		
Cinema	■						
OTT	■	■	■			■	■
Other media	*	*	*	*	*	*	
National	■	■	■	■	■	■	■
Regional/Local	■	■	■	■	■	■	■
CPG	■	■			■	■	■
Pharma	■	■	■			■	■
Retail	■	■		■	■	■	■
Financial	■	■		■	■	■	■
E-commerce	■	■			■	■	■
Automotive	■	■		■	■	■	■
Other product categories	*	*	*	*			*
Dependent variables							
Sales (capable of incorporating client sales data)	■	■	■	■		■	■
Others mentioned							
Web site visits	■						■
Searches	■						■
Store/location visits/foot traffic	■			■	■		■
Mobile app downloads							
Revenue							■
Brand metrics (e.g., awareness, consideration)							
Others	*	*	*	*		*	*

* See Section 4B, pages 62-63

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Effects typically estimated							
Media							
Creative							
Seasonality							
Frequency							
Competitive marketing							
Other	*			*			*
Independent variables typically included							
Weight of each medium							
Probability of exposure to each medium							
Number of exposures to each medium							
Exposures to other media beyond those client focused on							
Creative							
Engagement with the brand							
Buying history							
Duration of exposure							
Demographics							
Geography							
Price							
Promotion							
Product distribution							
Others	*	*	*	*			*
Brand tracking metrics typically included							
Brand familiarity							
Brand favorability							
Brand consideration							
Purchase Intent							
Others	*	*		*			

* See Section 4B, pages 63-64

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Media typically work with in analyzing ROI/ROAS/Lift (green=alone, yellow= in combination with other media)							
Linear TV							
VOD							
Addressable TV							
Premium TV viewed on computer or mobile device							
OTT							
Print							
Static Out-of-home							
Digital Out-of-home							
Radio							
Other audio							
Search							
Mobile							
Online video							
Online display							
Paid social							
Walled gardens							
Other	*	*					
Frequency of studies with . . .							
OTT	10% or less	50%, of which 80% include other media	Many	Included in approx. 40% of digital campaigns in combo with other media	5-10%	50% of which 90% are with other media	15% alone, 5% in combination
VOD	5% or less	60%-70% of which 60%-70% include other media	Some, always in combo with other media				5% alone, 5% in combination
Addressable TV	10% or less	40%-50% of which 40%-50% include other media	Many		10-15%		

* See Section 4B, page 64

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Capable of analyzing these combinations in a single campaign							
Linear TV, OTT, Addressable							
Linear TV, VOD, OTT, Addressable, Premium TV viewed on computer or mobile phone							
Level at which medium is measured: D=Device, P=Person, H=Household, A=Aggregate, O=Other							
Linear TV	D, P, A	D, A	H*	D, H	H	D, H, A	D, P, H, A
VOD	D, P, A	D	H*	D, H		D, H, A	D, P, H, A
Addressable TV	D, P, A	H	H*	D	H	D, H, A	D, P, H, A
Premium TV viewed on computer or mobile device	D, P, A	D	P*	D		D, H, A	D, P, H, A
OTT	D, P, A	H	P, H*	D	P	D, H, A	D, P, H, A
Print		D, P, H	P*		H		
Static Out-of-home		A	P*	D	P		
Digital Out-of-home	D, P, A	A	P*	D	P		
Radio	D, P, A	D	P*		P		
Other audio	D, P, A	D	P*	D	P	D, H, A	
Search	D, P, A	D	P*	D	P		
Mobile	D, P, A	D, P	P*	D	P	D, H, A	D, P, H, A
Online video	D, P, A	D	P*	D	P	D, H, A	D, P, H, A
Online display	D, P, A	D	P*	D	P	D, H, A	
Paid social		D	P*	D		D, H, A	
Walled gardens		D, A	P*	D	P	D, H, A	
Other	D, P, A	P, H					
Unit of Analysis Typically Analyzed							
Individual							
Household							
Cookie							
IP Address							
Device							
Store							
Market							
Other	*		*				

* See Section 4B, page 64

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Data sources used							
TV ad exposure files							
Digital ad exposure files (i.e., cookie files)							
Campaign log files							
Viewability data	TV and digital video	Digital all the time, including display; TV if available					Both TV and digital
Subscriber files							
Registration records							
Loyalty card data							
Store-level sales data							
Credit card transaction files							
Consumer panels							
Cross-sectional surveys							
Other data sets	*	*	*	*			*
Additional variables typically included in analysis							
Other marketing factors							
Other non-marketing factors							
Seasonality							
Weather							
Other media							
Use of control group to which exposed group is compared							
Always or almost always							
Sometimes							

* See Section 4B, page 64

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Typically included in analysis							
Diminishing returns							
Baseline consumption, behavior or purchases							
Pre-campaign sales data							
Halo effects of sister brands							
Adstock							
Competitive activity							
Interactions/Synergies between media							
Time period for pre-campaign sales typically included	Depends on CRM sales data to be ingested, industry category, typical buy cycle	3 years	Six months			Dependent on available data and client measurement goals. Can customize as needed.	Depends on the Adstock determined by the analysis. In regressive models, data for up to one year prior are considered.
Use of experimental design							
Always/Usually							
Sometimes							
Experimental design typically employed							
Randomized control trials							
Ghost ads							
Intent to treat							
Other design			*	*		*	

* See Section 4B, page 64

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Typically provided to clients							
Relative lifts within the test and control groups							
Estimated lifts among all exposed individuals or households in the target market							
Estimated lifts among all exposed individuals or households							
Baseline expected sales/ visits/ conversions/ registrations/ inquiries absent any media or advertising							
Estimates of media effects							
Estimates of creative effects							
Estimates of other factors	*	*		*	*		
Key performance indicators used to judge validity of results	Constant and consistent repeatable data pattern KPI's to be more and more confident in broadcast and publisher attribution methodology, described in more detail in Table 4B, Page 65	Post-campaign data, predicted vs. actual AVSR (ROAS/ ROI) and ACPA (CPA)		Reports at a 90% or greater confidence level to ensure there is statistical significance.	Client feedback, benchmarks of performance of campaigns we measure	The distance metrics and statistical precision	Track client outcomes over time, such as cost per response metrics, sometimes scored against an internal benchmarking process, described in Table 4B, Page 65

* See Section 4B, page 65

Section 4, Continued	AnalyticOwl	C3 Metrics	Veeva Crossix	Cuebiq	Ninth Decimal	SambaTV	TVSquared
Actions taken to validate results (Green=Always, Yellow=At least half the time)							
Cross-check internally to assure the accuracy of calculations							
Check results against Census data, when possible							
Compare conversion estimates to "downstream conversions" or increases in actual sales							
Compare results with other data streams, such as cross-sectional lift studies and longitudinal tracking studies							
Perform A/A testing of models to assess whether the model would measure a change in sales if there were completely random exposures to a campaign							
Use random control trials (in which a random, blinded portion of the target market receives PSAs or ghost ads instead of branded ads) to validate the models							
Compare models to results using synthetic data							
Typically analyze post-campaign data to assess actual results of campaign in the marketplace							

SECTION 4B: PRODUCTS THAT TYPICALLY USE A DEPENDENT VARIABLE OTHER THAN SALES AND TYPICALLY DO NOT INCORPORATE SURVEY DATA: OTHER PRODUCT ATTRIBUTES

	Other Applications
AnalyticOwl	Optimization of creative, schedule, website, search, social, foot traffic, sales metrics
C3 Metrics	Multi-Touch Attribution (MTA), Unified Marketing Measurement (UMM), Marketing Mix Modeling (MMM)
Cuebiq	Identify and activate audience segments that are most responsive to campaign messages.
Ninth Decimal	Enable clients to optimize in-campaign
SambaTV	Incremental, Causal TV Attribution, Attitudinal, and Sales Lift capabilities
TVSquared	Short-term impact of linear and digital TV campaigns (short-term spike analysis); Longer-term impact of linear and digital TV campaigns (Adstock and longer-term brand impact); Household-level (impression-based) insights for linear and digital TV campaigns (reach, frequency and audience analytics)
	Other Outcome Metrics
AnalyticOwl	Proprietary outcome metrics of VPA (visits per airing) and VPD (visits per download)
C3 Metrics	Proprietary metrics: AVSR (Attributed Value to Spend Ratio) = Attributed ROAS and ACPA (Attributed Cost Per Action)
Veeva Crossix	Other healthcare-related behavioral metrics, including doctor visitation, lab tests, conversion to category, adherence to brand, etc
Cuebiq	Projected Incremental Visits, Cost Per Incremental Visit, Impressions, Consumers Reached, Projected Visits, Cost Per Visit, Visit Rate, Top Stores (DMA), Time Between Impression and Conversion, Dwell Time
Ninth Decimal	Cost Per Visit/ Cost Per Incremental Visit
SambaTV	Survey/brand lift via 3rd party enablement, Sales lift
TVSquared	Household-level insights on overall level of response and detail of who is responding to the TV advertising campaign across a range of dimensions.; Reach and frequency; Custom brand KPIs such as app engagement, registrations, etc.
	Other Media covered in campaigns along with TV and Digital
AnalyticOwl	Cable TV, streaming TV, OTT, satellite radio, streaming radio, podcasts, Out of Home video
C3 Metrics	In-App
Veeva Crossix	Point-of-Care, CRM, Advanced TV
Cuebiq	Digital OOH, Digital Radio, Advanced TV, Social
Ninth Decimal	Desktop, mobile, website, search, social
SambaTV	CTV

Section 4B continued	
	Other product categories covered
AnalyticOwl	All industry categories
C3 Metrics	Education, Insurance, Travel
Veeva Crossix	Providers (Hospital systems, large group practices)
Cuebiq	Dining, Travel & Tourism, Entertainment, Shopper Marketing, Education
TVSquared	Travel and hospitality, Apps, Gaming, Subscription services
	Other dependent variables
AnalyticOwl	Keyword traffic, referral traffic, social traffic,
C3 Metrics	Variables (leads or another KPI/Conversion events) which are higher in the sales funnel.
Veeva Crossix	Any health behavior, including new to brand Rx, new to category Rx, doctor visitation
Cuebiq	Offline visitation behavior vs. past Behavior
SambaTV	- Linear TV impressions - at the household level - Digital impressions - by device, social platform, or individual - Advanced Audience Segments (Behavioral, Psychographic, etc)
TVSquared	Variables vary by campaign, but they could be consumer research activity, engagement with brand platforms (e.g. app), etc.
	Other effects typically estimated
AnalyticOwl	Response from a specific ad spot or impression across station(s), market(s), show(s), day(s), daypart(s), schedule(s)
Cuebiq	Panel bias identified and removed by looking at demographics, brand affinity, distance between campaign and POI, lifetime value, frequency seen per day, device type, behavioral tendencies -- breadth of movements, distinct locations visited and average dwell time
TVSquared	Granular performance analytics by days, dayparts, networks, programs, channels and genres
	Other Independent Variables Typically Included
AnalyticOwl	Creative, Day, Daypart, Ad Duration, Website, Search, Social, Foot Traffic metrics
C3 Metrics	Creative messaging
Cuebiq	Visit History to establish normal behavior, or a baseline, for both exposed and unexposed consumers
TVSquared	Media dimensions (e.g. network, daypart, weekday, date, placement group, unit length, positioning etc.)

Section 4B continued	
	Other Brand Tracking Metrics Typically Included
AnalyticOwl	Brand engagement with website, search, social, foot traffic across devices; when you correlate foot traffic to ad times at scale the data can show patterns related to brand engagement - especially for car dealers, QSB and others where it's easier to segment brands by retail location.
C3 Metrics	Can utilize brand tracking metrics.
Cuebiq	Top stores visited and dwell time (aka time spent in store)
	Other Media Work With in Analyzing ROI/ROAS/Lift
AnalyticOwl	Streaming radio, satellite radio, podcasts
C3 Metrics	Direct Mail
	Note on Level at which Media are Measured
Veeva Crossix	Media measurement is done at a household or personal level. However, only HIPAA-certified, de-identified, *aggregated* results are delivered to customers.
	Other Unit(s) of Analysis Typically Analyzed
AnalyticOwl	Proprietary success metrics of VPA (visits per airing) and VPD (visits per download); by individual device, individual user, individual visitor.
Veeva Crossix	Resolved identity across devices and connecting individuals across multiple sources of data
	Other Data Sources Used
AnalyticOwl	Google Analytics or Adobe Analytics to connect an advertiser's website, search, social metrics. Location data and podcast download data. Post log data used to create automated ad reports for media sellers.
C3 Metrics	Attribution Data Cloud
Veeva Crossix	Prescription data, medical claims data, clinical data, healthcare professional target lists
Cuebiq	Location-based data
TVSquared	Brand first-party data (web, app, phone, offline)
	Other experimental designs employed
Veeva Crossix	Unexposed lookalike controls, based on health data
Cuebiq	A neural network to randomize control group selection to filter out bias.
SambaTV	Randomized control trials, and TV Synthetic Control. Measure the conversion rate or other target variable within the exposed group, and then construct control groups or use randomized control trials to measure the same target variables in "similar", but unexposed, HHs. Then compare the target variables between the various groups in order to measure a true causal lift attributed to having been exposed to an ad.

Section 4B continued	
	Estimates of Other Factors Typically Provided to Clients
AnalyticOwl	Frequency and schedule effects
C3 Metrics	AVSR / ACPA
Cuebiq	Estimates that scale up to the overall reach and impact of a campaign. To ensure accuracy, align projections by funnel criteria, demo proportions, and the specific geos where media is being served, using geo-specific match rates. Then project out using the exposure rate and apply it to the whole (A18+) population in that same geographical area.
Ninth Decimal	Other media dimensions/segments as defined by our clients
	Detail on Key performance indicators used to judge validity of results
AnalyticOwl	Explanation of "Repeatable data pattern KPIs:" For example, does a legal advertiser always see a greater response in the day time daypart on TV, and are there any specific TV shows that resonate more that are repeatable and, when aggregated across all legal advertisers, consistent?
TVSquared	Track client outcomes over time, such as cost per response metrics, repeat visits, account creation/registration, special offers, requests for quotes, online bookings, subscriptions, orders and order size, app downloads, onsite engagement, sales and associated revenue, to ensure that the planning choices based on the analysis are improving performance. Where appropriate, these client outcomes are also scored against an internal benchmarking process to ensure that individual client outcomes do not fall outside of the expected range for results.

IV. APPENDIX: PRODUCT DETAIL

APPENDIX: DETAILED RESPONSES:

605

Methodology used to measure lift/ROI/ROAS:

Random Control Trials:

Random Control Trials randomly assign exposed and unexposed households, ensuring that the sampling is reflective of the full universe and the exposed and unexposed groups mirror one another. In the case that the first sampling is an outlier, this is realized through subsequent random sampling. RCTs are subsetted from 45 million households and each sample is weighted to the full universe through industry approved projections, ensuring that ad effects are reflective of the full footprint.

Always-on ROAS:

For any non randomly assigned advertising campaign (such as linear TV ad campaigns), there are natural biases within the exposed population: ads are aired on certain networks, at certain times, and will only be seen by households tuned to that network at that time.

Proving a causal relationship between ad exposure and a measured outcome requires proper accounting for all other factors that *could potentially* cause the outcome we're evaluating, except for ad exposure. Only after accounting for any effects from all of these other factors can causality actually be evaluated.

To determine causal impact, the exposed group and the unexposed group must be homogenous (the same) across all metrics, especially on the predisposition to the variable being measured. To remedy this, 605 creates a synthetic control which corrects for the biases within the unexposed group and makes the two populations homogenous. This method incorporates predictor variables across TV viewing behaviors, demographics, and custom data to align treatment and control households on their propensity to see ads and react.

Through industry-approved nationally projected TV metrics, Always-on ROAS provides ad campaign effects reflective of the full population and corrects for the biases present in naive tune-in lift calculations when randomization is not possible. With full matching rights to over 21 million TV households' live and time-shifted viewing data across STB and ACR, 605 offers clients the ability to measure the causal impact of advertising across a wide array of behaviors, including: TV tune-in, brand favorability (surveys), purchases, search activities, foot and web traffic. 605 is not only able to evaluate the impact of advertising on the full funnel, from awareness to purchase, but also determines granular effects within, such as: ad effects on any segment and breakouts of campaign exposure impact across networks, dayparts, durations, creatives, etc. through modeled ad-stocking allocations.

APPENDIX: DETAILED RESPONSES:

605 IMP4CT:

605 IMP4CT is the client facing product that implements the methodology from RCTs and Always-on ROAS. **IMP4CT** allows users to evaluate any campaign, across any targets or exposure dimension, and create a catalogue of learnings to help them make informed decisions about future planning. 605 IMP4CT is a web-based advertising attribution platform built on top of a massive, 100% matchable, deterministic dataset spanning over 21MM anonymized households and powered by a proprietary causal attribution methodology that relies on a high-dimensional matching algorithm to ensure the most reliable solutions in the industry. IMP4CT offers measurement for both Random Control Trials as well as Always-on ROAS.

Sources and types of data on walled gardens

Currently Facebook and Pandora are participants in the ARF/605/Central Control/Bill Harvey Consulting Random Control Trial (RCT) Initiative, and other walled garden participation is anticipated. Also in Random Control Trials, Intent To Treat designs can be used to measure the walled gardens individually and in combination with each other and with other media.

Steps typically taken to enable analysis to be projectible to the target population

Projecting to universe estimates (or a targeted population) utilizes person level demographics, TV compositions and geographic attributes.

Control group

A. How it is selected: In RCT, controls are randomly selected in an identical manner to the treatment group. In RCT, the control groups and treatment groups are drawn randomly from the starting set of client selected target IDs. In Always-on ROAS, 605 implements a synthetic control matching algorithm to ensure the exposed and matched unexposed groups are similar on all metrics except for ad exposure.

B. Steps taken to ensure that control group members have not been exposed: In RCT, check monitoring, set top box, and ACR records are used to make sure a control group member did not receive the type of ad pertaining to the specific RCT study. In cross-platform, data are sometimes collected on the individual level and are rolled up to household level during matching with media or purchase data that is at the household level. With Always-on ROAS, impression data ensures the unexposed are clean.

C. Steps taken to ensure test and control groups are similar and representative of target population: In RCT, initial checks are used to ensure random samples are representative, balanced on all attributes against the full UE and as such the two populations mirror one another. In Always-on ROAS the synthetic control verifies this. In both RCT and Always-on ROAS, the test and control groups are projected to the full desired universe using consistent industry-approved weights, ensuring representation.

How other factors that could affect the dependent variable are controlled

Random Control Trials and Always-on ROAS ensure that the Exposed and Unexposed (matched unexposed for Always-on ROAS) groups are reflective of one another across all dimensions except exposure, including: geographic attributes, demographic attributes, behavioral attributes, viewership attributes, etc.. Ensuring that the two groups are the same across all of these features reduces the impact of outside influences to a minimum. Always-on ROAS takes a further step to remove any remaining bias in matched populations through a "placebo" adjustment. Other outside factors can be controlled for as well to the degree that the client can make such data available, e.g. competition, price, promotion, other media, earned and owned media, weather, local economic conditions, recalls, pandemics, product innovations, etc.

How analysis accounts for . .

A. Diminishing returns: Reach Curves

B. Baseline consumption, behavior, or purchases: Comparisons between test study period and baseline period

C. Pre-campaign sales data: Comparisons between test study period and baseline period

D. Halo effects of sister brands: Statistical interaction detection

E. Competitive activity: Whatever the client wants and can provide (e.g. share of voice, RMT data comparing client brand with competition, overlap by household between client and competitive ad exposure, etc.)

F. Interactions/synergies between media: Statistical interaction detection

How exposures across devices and channels are de-duplicated

By logic checks in automated editing.

How creative and media effects are distinguished

RCT allows through Latin Square design. Always-on ROAS holds media constant to examine creative effects and vice versa. Ad Stocking algorithm is implemented for allocation of ads across various dimensions.

Other validation techniques used

Internal validation utilizes stability checks, sampling techniques and repeated measures. 605 strongly recommends that single source results be validated by RCT before spending large sums of money on new media/creative.

APPENDIX: DETAILED RESPONSES:

ACXIOM

Methodology used to measure lift/ROI/ROAS:

ROAS / ROI methodology is based on revenue (or margin) attributable to marketing / advertising action. The value of consumer activity that can be tracked to marketing signal is identified as the return and then divided by the expenses associated with marketing / advertising investment or longer-term total investment for ROI. Variations of Lift / ROI and ROAS are available where the effects (attributable returns) can be decomposed to channel, tactic or other covariates which can be measured.

Sources and types of data on walled gardens

Our walled garden partners provide a measure of marketing signal by way of either exposure or opportunity for exposure data which can be matched against first party transactional data for closed loop measurement.

Steps typically taken to enable analysis to be projectible to the target population

Test and control groups are balanced for bias relative to initial audience selections using synthetic control group processes (sampling strategies and machine learning based). Acxiom's solutions are developed with specific audiences and customer segments in mind; so we know the addressable target population and do not factor in estimates beyond the specific addressable population defined within a given campaign. Forecasting methods can be applied to testing practices to estimate total impact of marketing efforts.

Control group

A. How it is selected: Control groups are generally selected by Advertisers, often times based on consulting input from Acxiom. A general rule of thumb is that control groups be selected randomly as a final step prior to audience delivery (onboarding / letter shop) after all suppressions and stratifications have taken place.

B. Steps taken to ensure that control group members have not been exposed: It is inevitable that control group members are exposed to marketing signal. To that end, our methods use suppression of exposed control and then debiasing between test / control after suppression: Control group individuals who receive exposure are removed from the control group. This likely creates an underlying bias between test and control groups as the random selections prior to the campaign are likely no longer random. To compensate for the bias, a process to develop a non-biased view of the control group (synthetic control) is deployed.

C. Steps taken to ensure test and control groups are similar and representative of target population: See (a) and (b) above.

How analysis accounts for . . .

A. Diminishing returns: Response models and media/Exposure models can be developed to demonstrate where diminishing returns exist.

B. Baseline consumption, behavior, or purchases: Pre-campaign windows are used for demonstrating baseline behaviors.

C. Pre-campaign sales data: Pre-campaign windows are used for demonstrating baseline behaviors

D. Halo effects of sister brands: Lift studies are focused on the directly measurable marketing signal (single or multi-channel). Halo effects are detected in our MTA solution where external marketing signal can be captured. The MTA solution provides a fractional attribution view whereas lift studies provide a discrete view of attribution.

E. Interactions/synergies between media: Lift studies can include first and higher order effects provided that the effects are generated via experimental design a priori.

How exposures across devices and channels are de-duplicated

If exposure data includes true duplicates, they are removed through our QA / QC process. The QA / QC process leverages person-based identity spines in conjunction with exposure data and metadata to identify true duplicates.

Duplicate exposures come from multiple sources and are handled on a case by case basis with custom business rules specific to the case. Duplication can be either intentional (i.e. common in digital marketing) or non-intentional (i.e. data quality related). Intentional duplication, or multiple exposures / increased frequency, can be left untreated. That is, a single or multiple exposure is treated the same way. Unintentional duplication, often times resulting from data quality issues, is eliminated by deduplicating the exposure data on key fields contained within the data. Examples of these fields may include: Exposure ID or a composite field of individual ID, device ID, site ID, date/time stamp.

APPENDIX: DETAILED RESPONSES:

ALPHONSO

Methodology used to measure lift/ROI/ROAS:

We use a test control methodology to measure lift. We create a test group of devices that were exposed to the advertisement and a corresponding control group of devices that were not exposed to the advertisements. To minimize if not eliminate the influence of other factors, the intent is to find devices in the control group such that the only difference between a device in the test group and its corresponding device in the control group is that the one in the test group was exposed to the brand advertisements at some time during the flight range and the one in the control group was not.

Alphonso supports multiple methodologies for creating control groups. The methodologies facilitate using one or more attributes of devices to determine similarity and create a match across test and control groups. For example: Match the devices in the test and control groups by geo location (markets/zip-codes), by pre exposure visitation/purchase behavior, or by TV-viewing behavior along with the geo location.

The test control analysis is done on a nationally represented user base to ensure that the incrementality can be projected easily. Once incrementality is computed on the test group, the ROI/ROAS is computed by projection, based on the total reach of the campaign.

Steps typically taken to enable analysis to be projectible to the target population

Analysis is run on nationally represented Households (distribution across DMAs etc is normalized). This analysis is completely deterministic i.e we know who saw the ad and who converted and are doing a 1:1 match. Post that, we do a simple projection to the US population, when needed.

Control group

A. How it is selected: Multiple methods to select control group, ranging on picking similar audience based on demographics, TV watching behavior, pre-campaign purchase behavior and more. Alphonso supports multiple methodologies for creating control groups. The methodologies facilitate using one or more attributes of devices to determine similarity and create a match across test and control groups.

B. Steps taken to ensure that control group members have not been exposed: Exposure is considered based on household regardless of the device used. Alphonso has a proprietary device graph (supplemented with third party device graph) which creates a household association based on TV, IP addresses, our mobile devices in a given time period. Note that we can only ensure that there are no exposures on all known devices from Alphonso viewpoints. However, our device graph is representative and hence the proportion of devices unknown to Alphonso is distributed equally across the exposed vs non-exposed groups. And since the goal is to determine the difference/lift between these two groups, it does not change the final results.

C. Steps taken to ensure test and control groups are similar and representative of target population: We remove TVs at airports, bars, etc as well as remove outliers, such as for the TVs that are turned on more than a certain threshold. Similarly, if the IP address associated with a TV is associated with a large number of mobile devices, we do not include that in our analysis. We ensure that the test and control groups picked are nationally representative in various ways (demographics, geography, TV watching behavior).

How other factors that could affect the dependent variable are controlled

Create a balanced panel, which is selected to ensure that all demographics and geographies are appropriately represented. By 1:1 pairing of test and control, make sure that the outside factors are influencing the test and the control group the same way .

How analysis accounts for . .

A. Diminishing returns: Frequency analysis to determine optimal frequency

B. Baseline consumption, behavior, or purchases: Using control group as well as time-based analysis

C. Pre-campaign sales data: Test and control groups are picked based on similar pre-campaign purchase

D. Halo effects of sister brands: Test and control groups are picked based on exposure to sister brands, i.e., equal exposure to sister brands

E. Adstock: Analyzing decay effects as well as saturation effects

F. Competitive activity: Test and control groups are picked based on similar exposure to competitors

G. Interactions/synergies between media: Test and control are picked based on exposure across different media.

How exposures across devices and channels are de-duplicated

Use IP address for households which have had a stable IP address.

How creative and media effects are distinguished

Alphonso can perform analysis at the media level as well as at a creative level to understand independent impact of each.

Other validation techniques used

We also use MMM as well as time-based analysis to validate our results.

APPENDIX: DETAILED RESPONSES:

ANALYTIC OWL

Methodology used to measure lift/ROI/ROAS:

Correlation co-efficient – timed events cross matched for on air / off air lift and aggregated for industry level attribution benchmarks.

Steps typically taken to enable analysis to be projectible to the target population

All attribution data is geo-fenced and aggregated to determine predictive attribution in similar markets with similar population profiles. No need to project to a target population, unless we're looking at large data trends and need to look at similar sized markets as an indication of potential attribution.

Control group

A. How it is selected: Automated by our proprietary attribution dashboard. We look at off air users as the control group. Control group of visitors/users is automatically calculated by comparing those that responded versus those that did not within a tight time window.

B. Steps taken to ensure that control group members have not been exposed: Data mining of time stamped responses and letting Big Data sets show us the directional insight trends. Model control groups based on immediate response.

C. Steps taken to ensure test and control groups are similar and representative of target population: All done by market area, so geo-fenced responses from the same markets, same population create consistent test and control group to measure creative, schedule, website, search, social, foot traffic, podcast attribution. Purchase history can be ingested if the client provides.

How other factors that could affect the dependent variable are controlled

Time stamp – by looking at website, search, foot traffic data trends at scale we can determine directional insights that can be controlled by specific time stamps – tight measurement windows to lessen instances of overlap with other commercials and longer time frames to reflect possible buy cycles.

How analysis accounts for . .

A. Diminishing returns: We can see declines in creative over time where the messaging may get stale and need refreshing.

B. Baseline consumption, behavior, or purchases: Control group of users at times when no commercials aired

C. Pre-campaign sales data: Depends on CRM data, but generally looking at pre-post sales data

D. Adstock: Full creative attribution and A/B testing. We compare ads, we can test different ads, we can name the ad to determine if there's a male or female voice comparison or if a certain call to action or graphic for TV or brand that resonates with users / visitors.

E. Competitive activity: Can measure medium against medium if competitive data ingested. We use our own competitive data sets to compare TV and Cable TV response rates, for example.

How exposures across devices and channels are de-duplicated

We de-duplicate and also split media attribution when ads overlap by channel. Method is proprietary, but majority of the time this occurs automatically.

How creative and media effects are distinguished

Proprietary attribution is by market(s), station(s), station format(s), show(s) and then also by creative(s). Every ad / creative message is measured in an ad campaign and the video / audio file can be uploaded to the AnalyticOwl dashboard.

Other validation techniques used

Constant and consistent data mining by aggregate, media partner, advertiser and industry – billions of data points to show directional insights

APPENDIX: DETAILED RESPONSES:

ANALYTIC PARTNERS

Methodology used to measure lift/ROI/ROAS

Analytic Partners has developed a proprietary unified solution called Commercial Mix modeling ('CMM') that integrates brand, customer, operational and touchpoint analytics to provide strategic and tactical results with both granular customer and full business views. Lifts are estimated by modeling the transformed impact of an activity on a specific KPI (e.g. Sales Volume, Traffic, Enrollments etc.) while accounting for all other relevant drivers simultaneously.

CMM identifies and quantifies the impact of all performance drivers and provides deeper insight into the root causes of that performance. This is done through associating performance driver results with granular details - for example marketing driver details in areas such as campaign execution, customer segment differentiation, operation factor variation and long-term impacts. The Commercial Mix Modeling methodology blends advanced Machine Learning (ML)/Artificial Intelligence (AI) techniques with statistical and econometric models in a holistic system, supplemented by learning experimentation. This blending allows for a whole greater than the sum of its parts by informing each model development with the insights gained from the other. Statistical models are complemented with an iterative machine learning validation procedure to provide more predictive, robust models.

Sources and types of data on walled gardens

Extensive data partnerships with Walled Gardens such as Facebook and Google, ingesting their data on a direct and daily basis at various levels of granularity pending analysis focus.

Steps typically taken to enable analysis to be projectible to the target population

We align with client to determine proper and reliable projection factors to map modeled business vs. total business. For example, modeling at week/DMA/store/sales and then projecting to yearly/Census (all Sales Channels).

Control group

A. How it is selected: For aggregate data, geo-based level measurements, we leverage advanced Machine Learning methods to define relevant performance clusters and match the test group to the control group. The guided design process includes performance relevant attributes (e.g., Brand Development Index (BDI), Category Development Index (CDI), Pre-Test Period Response Index, Sales Rates, Penetration, CPMs, Covid-19 related and other measures). In the case of user level data, we apply randomized sampling methods that balance the test and held out (control) group to ensure no systematic bias.

B. Steps taken to ensure that control group members have not been exposed: A combination of Operational and Tactical approaches. From Operations perspectives, we provide detailed and actionable experiment design parameters to ensure control group (markets as well consumer segments) selections are operational. In particular, we map our clustering outcomes to clients' relevant geo- and CRM segments to ensure a geo-region or consumer control group will be completely immune from testing experiments. In parallel, AP deploys a closed monitoring and correction system to counter the impact of control group exposure (e.g. TV exposure across DMAs). In particular, AP constructs a proprietary Contamination Factor to monitor and track all clustering and test/control matching attributes. If the control group got exposed and/or attribute conditions changed, the Contamination Factor would be calibrated to reflect the changes, and the lift impact will be adjusted after offsetting the impact of attribute changes.

C. Steps taken to ensure test and control groups are similar and representative of target population: There are two major steps. First, we stratify the target population into multiple clustering/segmentation units. Within the unit, all elements are similar enough. Across units, the elements are different enough. We deploy a ML-based clustering approach to derive the first pass of clustering. Then, we overlay with business segments that align with the client's region and CRM execution structure. The second step is to choose test and control groups within each representative stratified unit. A ML-based driver impact analysis is performed to identify top KPI drivers among available market/segment attributes; look-alike algorithms are performed to determine the best match options; Test-Control pairing options are overlaid with business considerations (e.g., existing geo- and consumer segment alignment and prior business performance history and corporate growth priority) to ensure full business coverage and unbiased representation.

How other factors that could affect the dependent variable are controlled

Our integrated and holistic approach provides a 360 view of relevant factors by leveraging CMM intel along with ROI Genome knowledge for similar products analyzed. In summary, we perform a Driver Impact analysis along with client prior CMM insights to determine the relevant experiment design attributes that have potential impact on the development variables or KPIs. We monitor and track the attributes prior to and during the experiment period. We apply the correction using ANCOVA measurement approach based on the actual attribute dynamics to correct lift measurement.

How analysis accounts for . .

A. Diminishing returns: Analytic Partners has a customized approach to all models; no assumptions are made regarding the influence of marketing or non-marketing activities on sales a priori. Instead, we apply various functional forms to empirically discover relationships. Diminished returns are estimated by empirically testing media response parameters for each media variable, and final curves are selected through a process of optimization.

B. Baseline consumption, behavior, or purchases: We apply various functional forms to empirically discover relationships.

C. Pre-campaign sales data: Pre-campaign sales data and corresponding market conditions are included as benchmarks to assess the net sales impact of the concerned campaigns. We want to avoid comparison of pre-post periods where unique or extreme circumstances take place (e.g. peak seasonal windows, heavy competitive pressure etc. and periods with unprecedented and anomalous events). Lift and incremental sales impact are measured after netting out the baseline sales performance in pre-campaign period.

D. Halo effects of sister brands: Halo effects of sister brands are tested in the models to understand if there is a branding impact among products.

E. Adstock: We apply various transformations to empirically understand lags, decays and retained impacts, especially since these have planning / scheduling implications.

F. Competitive activity: We evaluate both absolute as well as relative support e.g. Impressions, Share of Voice, absolute price and price gaps. We also test for internal cannibalization – switching for products with highly overlapping product attributes.

G. Interactions/synergies between media: To uncover synergies and interactions across variables, we look at periods where media channels are stacked vs. aired in isolation (e.g. OLV + OLA work better together) and leverage Structural Equation Modeling (e.g. TV helps Search).

How exposures across devices and channels are de-duplicated

Through stitching multiple sources where ID can be matched, as well as working with device graph partners. We most commonly use LiveRamp or Tapad's device graph, but have worked with others such as Barometric, Neustar, etc.

How creative and media effects are distinguished

Assuming sufficient weight, each creative support is a discrete input in the model, and this provides the overall response for a creative. A secondary step is required to account for media effect. In our framework, media effects are explicitly measured by understanding the impact of platform, placement, publisher, device, daypart, duration, weight levels, flighting patterns and others, while the remaining impact is attributable to creative.

Other validation techniques used

Analytic Partners adopts a rigorous model validation and quality control process. The specific validation criterion is a combination of model statistics, experimental design and bootstrapping tests.

- Model statistics are leveraged during model development to validate various hypotheses on model structure, individual driver impact and overall model fit.
- Bootstrapping is leveraged to validate model specification and estimation results. Iterative random samples are drawn to validate model robustness and estimation result consistency.
- We leverage experimental design in combination with mix (and MTA as appropriate) for validation and further testing.

APPENDIX: DETAILED RESPONSES:

C3 METRICS

Methodology used to measure lift/ROI/ROAS

Media spend vs. Attributed value at the lowest common granularity. The algorithm calculates incrementality based on the Media spend vs the calculated attributed value.

Sources and types of data on walled gardens

Facebook/Twitter/Snap for Geo-Holdout test/control augmented with click data & self-reported metrics. Google Ads Data Hub (ADH).

Steps typically taken to enable analysis to be projectible to the target population

C3 Metrics collects 90+% of the target population through proprietary tags embedded within digital advertising; will sync with an advertiser's CRM; and, if needed, augment the data set via an identity graph to ensure the analysis is projectible. In the case of new 'emerging' external data sources which have not been accredited or validated, our team will isolate these new sources and provide clients with separate offline analysis from our current platform.

Control group

A. How it is selected: The Attribution Data Cloud's MRC accreditation for desktop and mobile web viewability provides the ability to dynamically create control groups for display advertising. For other media types, geo-level pre-campaign sales &/or conversion data is analyzed for correlation, noise and other variables to determine appropriate test and control markets. Non viewable impressions and fraud are examples of noise.

B. Steps taken to ensure that control group members have not been exposed: Individuals in the control group are either geo-isolated with media suppression or (in the case of desktop and mobile web display advertising) the Attribution Data Cloud's MRC accredited viewability solution provides the ability to dynamically select individuals in the control group who have not been exposed.

C. Steps taken to ensure test and control groups are similar and representative of target population: 20% of the top and bottom outliers are removed – the core 80% is analyzed for weather, demographics and other exogenous variables.

How other factors that could affect the dependent variable are controlled

The core 80% is analyzed for weather and other exogenous variables.

How analysis accounts for . .

A. Diminishing returns: Marginal utility functions based on vertical and spend levels.

B. Baseline consumption, behavior, or purchases: Capturing all addressable & non-addressable media provides ability to establish base of consumers converting both with and without media exposure.

C. Pre-campaign sales data: Pre-wave data set used in the analysis.

D. Halo effects of sister brands: Capturing all addressable & non-addressable media across a portfolio with a single anonymous identifier. We are able to differentiate between the impact of media on sister brands and the halo effect through the C3 Algorithm.

E. Adstock: In addition to 3 years of 'sales' data, we also collect 3 years of all media impressions, cost, etc. which provides for the creation of an AdStock curve.

F. Competitive activity: Historical competitive GRP levels; available brand survey preference data.

G. Interactions/synergies between media

H. Working up from device level provides for a consumer journey map with interactions between media.

How exposures across devices and channels are de-duplicated

The Attribution Data Cloud and its integrated MRC accredited desktop and mobile web viewability solution is a proprietary data collection infrastructure designed to collect unique exposures and prevent data duplication.

How creative and media effects are distinguished

The Attribution Data Cloud distinguishes between creative and media effects as separate dimensions within the models. We capture the creative and media, placement, viewability and analyze the effectiveness, by placing all creative on the same index

Other validation techniques used

Predicted vs. actual AVSR/ACPA for paid media are compared with a correlation coefficient, which is calculate to determine how much of the variation in the dataset is accounted for by the model and SMAPE (Symmetric Mean Absolute Percentage Error) is calculated to assess the model's accuracy.

The validation model (abbreviated ""model f"" from now on) looks at a prior bi-weekly rolling attribution derived by C3 Metrics proprietary Attribution Data Cloud™ and its Bayesian modeling in conjunction with media spend, and attempts to predict actual results. Note that predicted versus actual is for paid media only such as TV, display, non-brand search, affiliate, direct mail, YouTube, paid social media, radio, and excludes

Once model f estimates the attribution for the bi-week rolling date range, it is validated to determine its accuracy. Predicted rolling bi-week data is compared to the actual rolling bi-week data in two ways to ensure maximum clarity and effectiveness.

1. Correlation Coefficient; this is performed to calculate how much of the variation in the dataset is accounted for by the model. The correlation coefficient is not a deciding factor of accuracy; it provides more of the spread of predicted values vs actual values. These are used to determine the trustworthiness of SMAPE values which truly measure the C3 Metrics model accuracy.

2. SMAPE (Symmetric Mean Absolute Percentage Error); this is calculated to gauge the model's accuracy. SMAPE is used specifically because MAPE puts a larger weight on negative errors (when actual is less than the predicted) than positive errors (when actual is greater than the predicted). SMAPE negates this, weighting both types of error equally. It's essentially a measure of how bad a model is. A SMAPE value of x% means ""for any given channel in this date range, the predicted value will be on average x% off the actual value."" SMAPE (with sanity check of Correlation Coefficient) is the determining measure of C3 Metrics model prediction accuracy.

Testing the model is done using past data, and validation is done using the same. Applying model values to future data can only be validated once the date range to be estimated comes to a close and estimated values are compared to actual values using the correlation coefficient checked SMAPE.

The Bayesian algorithms in our system need a significant amount of data (typically 4-5 months minimum) to reach peak accuracy of prediction, and a larger dataset is conducive to that end.

Predicted versus actual (model f) estimates based on several assumptions:

1. Past data is representative of current data. Market volatility is, by definition, not entirely predictable. Using past AVSR/ROAS values to predict attribution based on spend assumes past trends will continue into the future. The Bayesian algorithms in our system help to alleviate errors with this assumption, as the value it gives networks within channels are constantly changing as new data comes into the system. An example of discontinuity (past not representing the future) would be if IAB viewability standards change, Google allows a view tag in paid search.

2. All spend is correct.

3. All channel detail within channels are tagged correctly. The model assumes all funnels and value being used are 100% tagged correctly and all funnels being closed have all touchpoints in the customer's journey.

4. No fraudulent data is being fed into the system. C3's Attribution Data Cloud™ removes as much fraud as possible (cumulative counts of fraud removal are detailed in the C3 Metrics dashboard), but similar to how there will always be crime in New York City requiring a police force, all crime is impossible to fully eradicate. Certain types of campaigns have a higher chance of falsified data, and fraud would alter the funnels and attribution. This would in turn make all predictions in the future more inaccurate, especially for those with less data in the cache in the first place.

5. Lead gen clients are more susceptible to fraud due to the higher probability of robot-generated leads, or low value leads. They in turn tend to be less accurate in their predictions than other types of campaigns. However, lead gen campaigns tested were still very accurate, all above 70%.

APPENDIX: DETAILED RESPONSES:

COMSCORE

Steps typically taken to enable analysis to be projectible to the target population

Comscore has utilized several approaches historically to adjust for potential bias in the sample under observation in attribution studies. For panel studies, projection weights, derived for the full panel and used to project into the enumerated population estimate for the device type and market, are used scale the target response. For survey based studies, a frequency weighting method can be utilized to calibrate the distribution of frequency of exposure among respondents to match the frequency of exposure among the full campaign as measured through Comscore's vCE solution.

Control group

A. How it is selected: For retrospective attribution studies, non-exposed users are selected from a set of persistent identifiers where exposure to the target creatives never occurs. Exposure is identified through either vCE tag measurement on digital or passively collected TV exposure. For panel, the ID space is Comscore's panelist ID, for census data, it can either be a third-party browser cookie or a digital household defined by a device graph, and for TV, it is an offline household. All of which are required to be valid and active identifiers throughout the duration of the study.

B. Steps taken to ensure that control group members have not been exposed: The individuals in the control group are a set of individuals where media exposure is passively observed. The control group is selected among individuals where (a) passive observation is enabled and (b) no exposures were observed in that passive observation. Comscore takes one of several approaches for ensuring non-exposure in a control group for attribution studies. For digital census and TV data, only identifiers that have remained active for the duration of the study are considered for the control. For digital, the absence of the target vCE tag event for the duration of the study on a persistent ID is qualifying, given the deterministic, passive nature of the tag. For TV, second-by-second passively collected data is used to ensure that the control was not tuned-in to the ad at the designated time (based on an ad scheduled).

How analysis accounts for . .

A. Baseline consumption, behavior, or purchase: Baseline levels of dependent variable are estimated among the surveyed sample.

How exposures across devices and channels are de-duplicated

Proprietary device graph links passively observed media exposure across channels.

APPENDIX: DETAILED RESPONSES:

CUEBIQ

Methodology used to measure lift/ROI/ROAS:

We use the Exposed vs. Control methodology. The exposed group includes all users who saw the campaign, whereas the control group is composed of non-exposed users with matching attributes to the exposed group. We then observe both groups' behavior for the duration of the campaign. Also provide incremental uplift using AI-based algorithms to extrapolate for visits happening organically vs. those driven specifically by the campaign. If campaign budget is provided, we will also calculate cost per visit and cost per incremental visit so that brands can optimize against ROI/ROAS.

Sources and types of data on walled gardens

Is a certified Google Data Partner. Through their DoubleClick Campaign Manager (DCM) integration, able to provide independent, third-party offline measurement for the footfall impact of all Google properties, inclusive of Search and YouTube. Can render the conversions and visits driven by that media - in real time - directly within the DCM reporting interface.

Steps typically taken to enable analysis to be projectible to the target population

Built a diverse network of partner apps in order to reach a user base composed of different demographic and psychographic segments, which, through analysis, projects from those users to the larger US population.

Control group

A. How it is selected: Select control group to match the characteristics of the exposed devices on a 1-to-1 basis. Take into account several device characteristics, including: demographics, number of distinct days device is seen, number of points collected from a device during the campaign, general activity level of device, average dwell time, proximity to POI, frequency of visits to brands in the same vertical, and Android vs. iOS.

B. Steps taken to ensure that control group members have not been exposed: Cuebiq's control groups are selected post-campaign in order to have the largest amount of information available about the exposed group and ensure the individuals were not exposed to the campaign at any point. We start by selecting exposed users in Cuebiq's universe, then build control groups excluding those devices. If a control device is exposed later, it is immediately replaced. As a safeguard, our process won't run reports unless we have 1:1 matches.

C. Steps taken to ensure test and control groups are similar and representative of target population: We take into account several device characteristics, including, but not limited to, demographics, number of distinct days device is seen, number of points collected from a device during the campaign, general activity level of device, average dwell time, proximity to POI, frequency of visits to brands in the same vertical, and Android vs. iOS..

How other factors that could affect the dependent variable are controlled

To make sure that past visitation behavior controls for other factors, we consider natural store traffic fluctuations like those related to seasonality and store open/close dates. Because we always report back to a deterministic device, we build control groups to take into account the characteristics of the device itself with the aim of minimizing bias to a point where the two groups (control and exposed) have equal probability of converting.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: We consider past behavior of our matched devices to establish baseline visitation behavior from which we project incrementality.

B. Adstock: Results can be evaluated with time decay attribution models as well as our own multi-touch attribution model. In addition to offering traditional attribution models, Cuebiq also offers a proprietary data-driven model that uses AI to evaluate each instance a consumer was exposed to the campaign and identifies on the tactic level, which impressions contributed to in-store conversion. This way the model learns which tactics (creatives or publishers, for example) perform best. During campaign set up, we also provide attribution window recommendations based on brand vertical.

C. Interactions/synergies between media: Cuebiq fundamentally operates on a device level, so to ensure all cross-channel calculations are based on a single, distinct device, we remove duplicated users that have been exposed in another report. Deduplication is accounted for in across-channel analysis. Since we measure cross-channel performance (at the campaign-level) in addition to individual channel reports, we would not want to entirely remove a device from our panel.

How exposures across devices and channels are de-duplicated

Our cross-device solution considers all exposures to de-duplicate at the campaign level. To de-duplicate at the individual report level, we use macros to apply different attribution models to different campaign tactics.

How creative and media effects are distinguished

Distinguish between media and creative effects through our pixel and/or using macros within the pixel. We also accept impression logs. Additionally, reporting can be broken down by individual channel (Digital, Linear TV, et al.) or relevant tactic (platform/publisher, creative type, media type, DMA, daypart, device type, et al.)

Other validation techniques used

Our standard for statistical significance will always be with a 90%+ confidence level. Combined, they show marketers using our platform that campaign results were caused by something other than chance and are repeatable under similar conditions.

APPENDIX: DETAILED RESPONSES:

DATA PLUS MATH (a LiveRamp company)

Methodology used to measure lift/ROI/ROAS:

The D+M platform uses an ensemble of machine learning techniques to "learn" the relationship between ad exposures across multiple channels and the measured marketing outcomes. This technique uses the collected data to provide a true estimate of the impact that the different placements and components of a TV campaign have had on the final results. The D+M data science team has developed a model of consumer response and approach that can accurately measure and project true impact of video advertising across a range of screens.

Our models work by combining several different machine learning techniques to estimate the total impact of media exposure, as well as the impact of media exposure on a specific channel or platform or from a particular creative. As part of this modelling approach, we measure causal lift (incrementality) at the household level based on an increase in conversion rate due to ad exposures. We set up the model as an observational study, and we build a synthetic control panel based on propensity score matching (PSM). These casual lift measurements are used to inform models which model the total campaign impact and assign partial credit for each conversion or sale to exposures prior to the conversion. Partial credit is informed by the causal lift measurements, as well other factors such as the measured diminishing returns from frequency and ad stock decays.

Steps typically taken to enable analysis to be projectible to the target population

LiveRamp has a proven process to stratify, re-weight and calibrate the exposed group to proportionately resemble the national TV universe. The national conversion rate is computed based on this re-weighted exposed group. Based on syndicated data sets, demographic & psychographic composition of reporting footprint is balanced against the composition of the national TV universe. Cohorts that are over-represented in the reporting footprint will be under-weighted; cohorts that are under-represented will be over-weighted.

Control group

A. How it is selected: D+M has developed robust synthetic control techniques using propensity score matching to effectively control for bias in the exposed population and provide accurate metrics on incrementality and baseline. The model used to establish the synthetic control baseline includes HH demographics, DMA/region, past viewing behavior and past category/product purchase behavior (category dependent).

B. Steps taken to ensure that control group members have not been exposed: D+M measures ad exposure deterministically using ACR and pixel-based measurement against a panel of HHs, for which D+M has an accurate understanding of their television viewing behavior and online presence.

Steps taken to ensure test and control groups are similar and representative of target population: D+M has developed robust synthetic control techniques using propensity score matching to effectively control for bias in the exposed population and provide accurate metrics on incrementality and baseline. Test and control groups will be as identical as possible, with the only difference being the exposure. D+M

leverages a representative HH spine for which we maintain historic viewing patterns and demographics. These are HH's we can consistently match to cross device ad exposure data and online/offline conversion data.

How other factors that could affect the dependent variable are controlled

We combine as many of the brand specific and external factors as possible as features at the HH level, using IDL based linkages. The synthetic control techniques balance these factors, including demographics, DMA or Region, past viewing behaviors, past category purchase behavior, other media, direct marketing tactics, competitive advertising into HH. If a customer has a specific factor important to them to include, we can establish an approach either at a geographic or HH level.

How analysis accounts for . .

A. Diminishing returns: We measure calibrated, causal lift across a range of frequency bins and time periods, using the derived curves as an input to the attribution models. These frequency response curves are also available to the user directly to study the relationships between increasing media exposure (frequency) and diminishing returns in increased conversion rate.

B. Baseline consumption, behavior, or purchases: By appropriately establishing a synthetic control group of HHs via our propensity score matching approach, we are able to identify the true impact of the measured media to drive incremental conversion or sales. Our platform models the total sales or conversions as a combination of this incremental impact of media on top of other media and non-media driven sales that make up the baseline. Using this approach of modeling the total conversions or sales as a combination of the measured media, unmeasured media and non-media based factors, we can separate a baseline for the campaign, similarly to marketing mix models.

C. Pre-campaign sales data: When applicable, we include pre-campaign sales data as a variable in our propensity score model used to curate the proper synthetic control group of HHs. Ultimately, this helps tune our casual lift and attribution models and more accurately distribute credit to the media, as distinct from baseline sales/ activity.

D. Adstock: Impressions are dated in the model; so time decay is taken into consideration when carrying out attribution (i.e. an exposure that took place closer to the time of conversion will receive more credit than an exposure happening earlier)

E. Interactions/synergies between media: All campaign impressions, served across all measurable media channels and platforms, are used in a single, omni-channel model. This ensures that we are appropriately sharing/ apportioning credit to the various exposure points when we carry out attribution. Furthermore, we have a feature in our platform referred to as “Only Only Both”, where we explicitly show the delivery and performance specific to HH’s exposed to only one channel, two channels, etc. which is a great way to pinpoint synergies between media types.

How exposures across devices and channels are de-duplicated

Liveramp's offline and online identity assets give us a unique spine to accurately de-duplicate the delivery of video advertising across a multitude of screens and viewing modes. LiveRamp's technology leverages these online and offline graphs to deterministically match each exposure source to LiveRamp HH- and persons-level IdentityLinks. This deterministic match to HHs and individuals forms the key to join/create deduped universes of multiple sources of viewing and ad exposure data.

As an example, if MVPD A has subscriber PII that ties to IDL1, and OTT provider B has subscriber email that also ties to IDL1, the solution is able to accurately measure deduplicated reach and frequency into these homes.

How creative and media effects are distinguished

Creative and Media variables are included in the attribution models which distribute relative credit for different exposures. Total campaign impact, which includes the power of the creative and the media placement, is reported. This is how the consumer experiences the message, and so we believe this is the measure to focus on. In order to help brands take action in either media changes or creative changes to drive increased performance, every impression delivered at a HH level has the specific creative associated with it tagged and included in the model. The relative lift/impact of each creative is provided in order to evaluate how the overall Total Impact is being impacted by creative changes.

APPENDIX: DETAILED RESPONSES:

DYNATA

Methodology used to measure lift/ROI/ROAS:

Brand Lift is done using an unexposed (control) group of panelists and exposed (test) group of panelists. Both groups will participate in the research going through the same survey where metric performance is measured by comparison of results between control and exposed.

Sources and types of data on walled gardens

Google – Integrating with Ads Data Hub to receive YouTube exposure data. Amazon – Direct integration to collect exposure data for Amazon brand lift work. Also, others like Adobe (TV, Digital Ad Exposure), Pandora.

Steps typically taken to enable analysis to be projectible to the target population

During recruitment, we can target specifically for just panelists who are within the target population based on known profiles of our panel members. We don't typically project to the target population; we use the natural fallout to recruit in the footprint of the campaign. We do have audience validation data available for this purpose if requested by the client.

Control group

A. How it is selected: The control group is sampled on specific demographics or other variables matching the exposed group of the campaign. For publishers that tag with us, we can/have recruited based on passive visitation; we can also use location/DMA and custom survey questions (e.g., category use, industry membership)

B. Steps taken to ensure that control group members have not been exposed: Within the panel, we define sub-groups of panelists based on the type of measurement we can do for a panelist. For example, one sub-group is panelist with active cookies or active MAIDs. These sub-groups are used for sampling the various channels which ensures only panelists are included whom we can actively measure for the media channels. In some cases, OTS questions are used for certain channels. Will exclude any exposed panelists from the control group. Additional data cleaning is happening while fielding the study to check a second time for possible impressions against the control respondents of the survey. Data match in place for panelists where passive TV exposure is available. Addressable TV data is also delivered from set-top-box data (MVPD) and matched to panelists. We can use other passive data, such as location data at the client's request.

C. Steps taken to ensure test and control groups are similar and representative of target population: Control group is matched against exposed group on demographic variables at the time of recruitment. Control group is also weighted to the exposed group on demographic variables and other self-reported variables as required in the study, such as brand use or relevant behaviors. Category usage or brand usage is commonly used, as is self-reported Internet consumption.

How analysis accounts for . .

A. Competitive activity: Competitive data can be provided for most survey metrics including: unaided awareness, aided awareness, familiarity, favorability, intent, consideration, recommendation or other custom metrics at client request.

B. Interactions/synergies between media: Cross-media analysis identifies synergies between media channels. Break out respondents into cells for each combination of media exposure (e.g., Digital only, TV only, Digital & TV). We are launching an MTA methodology based on regression analysis that will provide an interaction term to measure media synergies.

How exposures across devices and channels are de-duplicated

We own our own first party, opt-in panel and maintain a device graph based on logins across all devices respondents use to interact with us. Where available and appropriate, we can use PII to determine that a panelist is or is not exposed to certain channels (e.g. Household level TV exposure)

How creative and media effects are distinguished

Within taggable campaigns, we use digital tags for both media and creative. For linear TV where we have behavioral data, that can be used to discriminate creatives. We can distinguish between media and creative effects either by creating individual cells (where sample is sufficient) or through MTA (multi-touch attribution) which measures the impact of the same creative through multiple media channels or the impact of multiple creatives through different channels. MTA is a more efficient approach.

Other validation techniques used

Use a Bonferroni test to prevent data from incorrectly appearing significant or to identify when we might be detecting a false positive.

APPENDIX: DETAILED RESPONSES:

FOURSQUARE

Methodology used to measure lift/ROI/ROAS

For ROAS, we use Behavioral Lift Sales / Ad Spend. Behavioral List is the percent difference between exposed users' actual visits during a campaign and their expected visit rates. Ad Spend is the total estimated campaign cost to advertiser by platform to date, based on spend data provided by the advertiser or partner.

Sources and types of data on walled gardens

We rely on ad exposure data from the publisher or walled garden and location data from opted-in users.

Steps typically taken to enable analysis to be projectible to the target population

Campaign results are weighted to account for demographic composition and the composition of media delivery for the campaign and projected to delivery of the entire media plan.

Control group

A. How it is selected: We use an outcome regression model to estimate the counterfactual visits for a given exposed user. The model uses 13 demographic factors, as well as geography, phone OS, and prior visitation to predict unexposed or counterfactual visitation. Given that we are using an outcome regression, the notion of 'selecting' a control group (or a subset of the unexposed) is not an explicit part of the methodology. Instead, the outcome regression model learns the behavior of similar unexposed users to estimate the counterfactual visits for a given exposed user.

B. Steps taken to ensure that control group members have not been exposed: We match impressions to users on a 1:1 basis via a pixel on the ad. We prioritize matching using a deterministic MAID-based match, but fall back to probabilistic matching via cookies when a MAID is not present in the pixel response. We use a combination of proprietary and 3rd party device graphs to facilitate cookie-based matching. Thus, for deterministic-based matching, we have 100% confidence that all unexposed users have not been exposed.

C. Steps taken to ensure test and control groups are similar and representative of target population: The notion of representativeness is built implicitly into the model vs other causal methods where it can be measured explicitly (e.g., propensity or direct matching). That said, we validate that the outcome regression model can accurately estimate average visitation behavior across the panel.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Using a synthetic control group.

B. Interactions/synergies between media: Omni-channel, fractional attribution, and optimal frequency analysis

How exposures across devices and channels are de-duplicated

Using a cross-device graph, as well as across Foursquare first-party audience user device profiles.

How creative and media effects are distinguished

We report on both media effects (via publisher-specific reporting) as well as creative effects via (tactic/line-item level reporting). Clients/Publishers interested in creative effects can use creative-specific tags in the pixel configuration to enable creative-specific reporting.

Other validation techniques used

We validate our results in several ways:

- For store visit estimates we rely on first-party ground truth validation surveys to ensure that the precision and recall are within acceptable levels to support measurement.
- For incrementality, there are two ways. First, we have run 'null tests' where we create artificial campaigns by assigning a random selection of users to the exposed group. We then validate that these artificial campaigns result in estimated lift that is not statistically different than zero. Second, we have created synthetic visitation datasets that have a predetermined level of lift (e.g., 5%) and validated that our production reporting can recover, statistically, that same level of lift.

APPENDIX: DETAILED RESPONSES:

IRI

Methodology used to measure lift/ROI/ROAS

IRI's Cross Channel MTA uses Random Forest machine learning in our modeling process. We use a test vs. control methodology to measure sales lift:

1. Matching Exposed Households: IRI receives exposure files throughout the media campaign via an on boarder partner, who converts those records from devices/cookies/OTT boxes to household records based on a PII match. We then match this file onto our Loyalty Card database in order to identify which households in our database were exposed to the media, and which were not. This group is our Exposed Households.

2. Test vs. Control Matching: We then match each Exposed Household to a control household based on prior 52 weeks of behavior. We match on Retailer distribution, Category ProScores (modeled audiences for shoppers with an affinity to purchase in the relevant category), Brand ProScores (modeled audiences for shoppers with an affinity to purchase the relevant brand), Pre-campaign Category Penetration, Pre-campaign Category Spend, Pre-campaign Category Trips, Pre-campaign Target Penetration, Pre-campaign target spend and Pre-campaign target trips. When measuring uplift, we can use either a common control (same control for all cuts), or household level control (different control group based on the nuances of the households exposed via each cut).

3. Covariate Selection (GLM): IRI evaluates multiple variables within the Generalized Linear Model (GLM): GLM accounts for Covariance between exposed group and control group, with an emphasis on the p-value reflecting how accurate the coefficient is for the total model. Individual coefficients are also evaluated. All values are validated for each model run within each program. Additionally, if fewer than three (3) causal variables appear in the model, further evaluation is completed. IRI uses a rigorous three-part Regression model to measure uplift with a separate model to evaluate impact on Penetration, Frequency, and size of transaction.

4. Uplift Confidence: Describes the significance associated with the interval estimate (for each variable measured) and provided at 80% typically. This is part of the model output and always reflected in data provided. Data is typically not reported to client if 80% threshold is not met for variables being evaluated.

5. Holdout Sample Validation: This validation is run when two or more of the validation metrics (1-4) do not exceed expected thresholds and when appropriate for the experimental design.

Sources and types of data on walled gardens

IRI has direct partnerships with all of the traditional walled gardens (Verizon Media, Google, Amazon, Facebook, Pinterest, and Snap). Partnerships exist to execute Marketing Mix, Targeting, and Market Measurement. We currently have partnerships with Verizon Media, Google, Amazon, and Pinterest to do HH level attribution (lift) and Facebook/Snap will follow in 2020.

Steps typically taken to enable analysis to be projectible to the target population

IRI runs lift models by analyzing uplift due to media exposure across key metrics such as sales, penetration and occasions via GLM methodology. IRI then extrapolates uplift to the total Campaign from sample population leveraging our nationally representative National Consumer Panel and calculates ROAS.

Control group

A. How it is selected: IRI matches each Exposed Household to a control household based on prior 52 weeks of behavior, as described in the methodology above. The media exposure file is provided to IRI by the client or agency, typically via Liveramp, Experian, Alphonso TV, etc.

B. Steps taken to ensure that control group members have not been exposed: Individual media exposure files are combined into a single cross-channel total campaign dataset. Households are classified based on their exposure to one or all channels and are matched to a forensic control after the measurement period so that we know the control has not been exposed to any of the channels. We are able to calculate lift by each individual channel as well as the impact of multi-channel exposures and their potential synergies. This approach enables an understanding of the exclusive and combined lift for each channel.

C. Steps taken to ensure test and control groups are similar and representative of target population: To ensure that the test and control groups are similar to each other and representative of the target population, we match based on a number of criteria, as described in the methodology above.

How other factors that could affect the dependent variable are controlled

IRI has a rigorous validation and QC process to ensure accuracy in our models. See methodology above for more detail.

How analysis accounts for . .

A. Diminishing returns: Our MTA model is capable of capturing the complex relationship otherwise difficult to model using traditional approaches, among exposure time/ touching sequence /impression frequency driven purchase behavior, including the diminishing returns effects on exposure/impressions

B. Baseline consumption, behavior, or purchases: IRI establishes a baseline by identifying non-exposed households to comprise the control group matched to the exposed group.

C. Pre-campaign sales data: IRI includes pre-campaign sales data in its models based on prior 52 weeks of behavior.

D. Halo effects of sister brands: IRI can run halo analyses for additional product groups (e.g. category, brand, portfolio, sub-segment).

E. Adstock: IRI includes lag periods as part of our measurement in order to account for adstock. Typical, lag period is 4 weeks after campaign end.

F. Competitive activity: Our attribution analysis uses a Generalized Linear Model that includes causal activity (Coupons, Features, Displays, Price Reduction) for the target brand UPCs as well as for competitor products. This ensures that any impact of competitor activity to the target brand is accounted for so that we can isolate the ad effectiveness of the target brand campaign.

G. Interactions/synergies between media: IRI calculates lift by each individual channel as well as the impact of multi-channel exposures and their potential synergies. This approach enables an understanding of the exclusive and combined lift for each channel.

How exposures across devices and channels are de-duplicated

IRI multi-touch attribution methodology accounts for exposure to a single ad and/or multiple ads by creating an interaction variable for those exposed to multiple different ads. This can be measured within diagnostic breaks including creative, publisher, target and ad type placement. The output incorporates overlap/path-to-purchase within sub-campaign variables. This provides sales Lift at individual break level as well as Lift resulting from cross-break exposure. Data is modeled at the HH level to drive precision.

How creative and media effects are distinguished

The granularity of IRI's measurement allows clients to understand sales lift impact across several key variables within a media campaign, such as target, channel, frequency, ad type, creative, and ad size. If there are other custom elements to a media campaign, IRI can report on these if they meet statistical significance in our modeling process.

Other validation techniques used

IRI uses a couple of different techniques to validate the results of its analyses:

1. Separate Controls by Break: Methodology that allows for measurement of campaign lift impact within the audience/demographic of a particular break where exposed HHs are compared to similar control HHs.

   a) Avoids confounding and correlation issues between breaks

   b) Reduces bias

   c) Produces variation between breaks.

2. Bootstrapping: Re-sampling approach that helps eliminate the by-chance alone variations that we usually see in the regression estimation outputs.

   a) Helps reduce errors due to chance, if one sample is selected

   b) Helps reduce matching-induced sampling bias in matching sample

   c) Results in higher incidence of significant results.

3. The use of Static Panel, the subset of our total FSP (frequent shopper loyalty card households) universe that consistently meet certain criteria in regard to spend, basket size, trips, and other criteria. This ensures that consumer behavior is consistent and reduces statistical "bounce".

   a) Arrives at more consistent trips, reducing period-to-period variance

   b) Removes poor or inconsistent shoppers from the sample

   c) Shoppers that buy minimum dollars will be considered.

APPENDIX: DETAILED RESPONSES:

iSPOT.TV

Methodology used to measure lift/ROI/ROAS

iSpot.tv lift analytics expose what media is working and not working for your TV campaign and helps determines where to allocate future media spend. ISpot's HH-based lift formula controls for users who would have converted or are likely to regardless of ad exposure, thus measuring the true causal impact of TV advertising. Lift sits in the iSpot TV Conversion product and is refreshed every 24hrs and provides insights by: Network Family, Network, Daypart, Conversion Type (web visits, registrations, purchases, etc.).

iSpot uses a test/control methodology in which we generate a synthetic control group based on TV viewership features and which cut of data is of interest (Network, Daypart, etc.). This weighted and matched group is then run through a logistic regression to determine lift. When necessary, iSpot also employs a Bayesian approximation approach in order to have the scale needed to generate lift at the network, and lower, level. Incrementality is also determined through this step and is multiplied by extrapolated exposed conversions (extrapolated from the raw attributed conversions) to yield the incremental conversions for whatever slice of the data is being analyzed.

Steps typically taken to enable analysis to be projectible to the target population

We generally have a nearly 1:1 device to HH ratio. Our measurement extrapolates to be representative of the US census at both the TV device level (impressions) and at the HH level (iSpot iGRPs and iTRPs provide translation to the Nielsen HH GRP and age/gender TRP measurement).

Control group

A. How it is selected: iSpot measures the causal impact of TV by creating exposed and unexposed control group for each TV network and each conversion type, every day. Our platform builds nearly 10,000 control groups in an automated fashion each day. In addition to lift, iSpot calculates conversion rates for each media placement, using a fractional attribution model that gives more recent impressions more credit (using a 7-day decay model). The iSpot platform allows for the selection of an attribution window of between 2 hours and 30 days and everything in between. The granularity of the conversion rate allows measurement and optimizations of creative, shows, daypart, pod positions, genres and more. The combination of lift and conversions enable the iSpot model to measure the incremental business driven by any network environment and measure ROI.

B. Steps taken to ensure that control group members have not been exposed: iSpot builds its models using carefully selected control groups. We do this with the intention of mitigating most of the effects of the other marketing channels in order to give TV-specific metrics. In the case of conversion data, we simply tie the event to TV exposures and do not claim TV is the only driver. Most of iSpot's clients are running a significant amount of digital marketing in addition to TV. Our control group methodology takes a TV centric approach that is digital marketing agnostic. The exposed and unexposed groups are well matched on viewership features and when we have tested, they're well matched on demographics as well. This means it's unlikely the control group is biased in a different way from the exposed group.
C. Steps taken to ensure test and control groups are similar and representative of target population: All models are subject to being evaluated to some unit of error. In the case of our products that use Coarsened Exact Matching (CEM) we'll pay close attention to the imbalance metrics, while in the case of a supervised learning model, we follow the standard data science process of generating cross-validated models and subjecting them to hold-out sets to understand accuracy and overfitting. It really just depends on the model being employed. Products generated by data science include well established and peer reviewed methods such as: CEM (mentioned above), Raking (from survey work), logistic regression, linear regression, boosted decision trees, etc.

How other factors that could affect the dependent variable are controlled

The iSpot methodology inherently controls for the effects of seasonality on the baseline conversion rate. The way it was built, it also inherently, though indirectly, controls for demographics and digital marketing channel effects.

How analysis accounts for . .

A. Diminishing returns: We use multiple attribution windows allowing clients to see their diminishing return.

B. Baseline consumption, behavior, or purchases: Control group generation

C. Competitive activity: We account for competitive ad exposures in our matching algorithms

How exposures across devices and channels are de-duplicated

We deduplicate via the use of our IP history table as well as our device graph (powered through the DMPs we've partnered with).

How creative and media effects are distinguished

iSpot has generated lift methodologies and attention methodologies that allow our clients to understand the effects of their creative on their conversions. We've done this by modeling and controlling for the non-creative effects in the case of attention and through the use of control groups in the case of lift.

Other validation techniques used

Generally speaking, we work closely with our clients to determine the effects of decisions made as a result of our analytics and/or platform. We are constantly using this feedback to determine the effectiveness of our products.

APPENDIX: DETAILED RESPONSES:

KANTAR BALANCED ATTRIBUTION (BA)

Methodology used to measure lift/ROI/ROAS

We use a multi-touch attribution model which includes a baseline control cell as well. Our attribution model allows for constrained optimization scenarios based on real-world limitations to data. The prescription for optimization can be built on the ratio of brand increase to sales increase desired for the specific marketing objective.

Sources and types of data on walled gardens

Advertising exposure data and survey data. The data is sourced and acquired by Kantar from our relationships with multiple walled gardens.

Steps typically taken to enable analysis to be projectible to the target population

The attribution model allows for analysis of the data by target population as well as micro-segments of population crossed by all variables. The contributing dataset is weighted to ensure a balanced demographic composition between test and control datasets.

Control group

A. How it is selected: The control group can come from RCT using a hold out or from twinning in the case of brand lift data for digital from certain publications where RCT is not possible.

B. Steps taken to ensure that control group members have not been exposed: In the case of RCT, this is done at the individual level and, if TV, data is matched to Kantar TV schedules to confirm TV exposure was not possible at that time. For digital, Kantar collects census-level exposure measurement, which ensures close to 100% coverage when determining control group status. In addition to passive/census-level exposure collection, Kantar also asks additional qualifying questions in surveys to confirm exposure/non-exposure. In addition to TV OTS measurement, Kantar also works with Samba to ingest TV exposure data passively via ACR technology.

C. Steps taken to ensure test and control groups are similar and representative of target population: Kantar uses RCT when possible. For example, when doing attribution on in-game advertising, we can use a holdout group pre-exposure that is randomly selected from the target group. In cases where this is not possible, we use a pre-campaign "twinning" approach to ensure exposed and baseline groups are matched prior to commencement of exposure so that there is not resulting effort to create a different group of exposed.

How other factors that could affect the dependent variable are controlled

Our MTA approach allows for many factors to be evaluated, such as proximity to a retail store where the product is sold, creative quality etc.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Baseline consumption, behavior or purchase can be used as a variable in the analysis. The analysis includes use of control (non-exposed) group data sources as baseline in addition to attributing lift to each ad exposure by controlling for impact from demographics and category and brand predispositions. Through granular modeling, each respondent is their own control.

B. Pre-campaign sales data: Pre-campaign sales data can be used to quantify the impact or as a variable.

C. Halo effects of sister brands: The MTA model allows sister brand impacts from sales or brand affinity to be additional variables.

D. Interactions/synergies between media: The MTA model allows for multi-variate analysis where all variables can be isolated or combined.

How exposures across devices and channels are de-duplicated

The deduplication process depends on the channels selected and the common variable amongst them. Because Kantar has a panel which different data sources can be matched to, we can align multiple sources for analysis. In addition, we can confirm if the person being measured was actually the one in the home who was exposed through OTS questions of the panelists. This allows us higher accuracy when using sources such as passive TV data.

How creative and media effects are distinguished

Kantar assesses creative quality through our Link solution. Link has been validated by the Marketing Standards Accountability Board to predict in-market sales and been used on over 200,000 creatives.

Other validation techniques used

Because Kantar also provides holistic brand guidance, we have ongoing longitudinal impacts of brand and sales. These provide an ongoing view of how marketing is impacting overall growth for the company so we can assess the impacts of specific Balanced Attribution studies to the actual brand and sales results over time.

APPENDIX: DETAILED RESPONSES:

KANTAR LIFT INSIGHTS (BLI)

Methodology used to measure lift/ROI/ROAS

Kantar employs an experimental (test/control) design to calculate the incremental lift between those exposed to advertising against a control baseline (not exposed). The typical measure is the delta between these two groups. ROI and ROAS metrics are derived based on a combination of brand lift and investment across media channels and audience fall-out. There are a variety of ROI/ROAS measures employed depending on the media type and the outcome measure. For example, if passive TV is being measured for sales, there would be a cost per unit measure. If it's brand impact, it could be cost per brand impact.

Sources and types of data on walled gardens

Advertising exposure data and survey data. The data is sourced and acquired by Kantar from our relationships with multiple walled gardens.

Steps typically taken to enable analysis to be projectible to the target population

We use a weighting process based on the delivery of the campaign to the target population. Sampling and weighting are designed to ensure the results achieved reflect the delivery of the campaign within the target audience.

Control group

A. How it is selected: The control group selection can vary by channel and is dependent on the exposure data that is available. The most common methods can include RCT, control/exposed twinning approach or the usage of specific media consumption metrics.

B. Steps taken to ensure that control group members have not been exposed: This depends on exposure method. In the case of TV measurement, an additional level of OTS is used to confirm the validity of test and control samples. Our passively driven sampling method allows for reassignment of respondents based on additional exposure that may have occurred from the point of sampling until survey completion.

   For digital, Kantar collects census level exposure measurement, which ensures close to 100% coverage when determining control group status. In addition to passive/census level exposure collection, Kantar also asks additional qualifying questions in surveys to confirm exposure/non-exposure and can leverage additional tactics such as hold-out samples or pre-control sampling.

C. Steps taken to ensure test and control groups are similar and representative of target population: Our weighting process weights the results to the target population as we already have demographic data from our panelists. Kantar also incorporates other behavioral and media attributes as co-variates within our weighting schemes

How other factors that could affect the dependent variable are controlled

In cases of sales, we look at prior purchase history; for behavior, prior behavioral history etc. We can also look at creative quality as we score creative using our Link suite which can greatly influence outcome measures.

In addition to deploying experimental designs, for observational studies, Kantar deploys our proprietary "twinning" control matching methodology which pairs individuals on a multitude of factors. Our twinning-based sampling approach ensures identical cohorts of sample aligned to the target population. Post sample is balanced to account for bias through weighting. Other behavioral or targeting variables such as segmentations are commonly used to control for any predisposition bias.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Panelists' history is used for the period prior to exposure or through the use of predisposition variables which can be included to weight out bias.

B. Pre-campaign sales data: Household sales are used for the pre-period to ensure control and exposed match.

C. Halo effects of sister brands: Campaign effects of sister brands can be measured by combining exposures across the campaigns to measure any halo effect that may be occurring. For example, does exposure to Product One's campaign combined with Product Two's campaign drive any incremental lift? There is also a possibility that "sister brands" can lead to a potential bias which would need to be weighted out to ensure that both control and exposed respondents are balanced. When campaigns are linked, we can see which respondents were exposed and use halo analysis to measure the impacts and contributions of individual campaigns on each other, including synergies across products.

D. Interactions/synergies between media: Our CrossMedia incremental lift solution looks at each channel in isolation as well as in combination.

How exposures across devices and channels are de-duplicated

Kantar's proprietary device graph that associates all devices (e.g. mobile/desktop/CTV, etc.) and end points (e.g. browsers) at a human level. All exposures and sampling methodologies as well as post-survey media exposure reconciliations are performed using this device graph's UID technology.

How creative and media effects are distinguished

We can score creative with Kantar Link to determine creative quality. Link has been certified by the Marketing Standards Accountability Board to align to in-market sales performance and has been used on over 200,000 creatives. Creative impacts can be distinguished by examining intra-media effects by exposure to individual creatives or creative groups. Additionally, ad diagnostics can be included as part of the survey itself.

Other validation techniques used

Because Kantar also has a significant holistic brand tracking business, we can compare the results of a specific campaign or brand to the overall sales over time for a company. This integration of brand tracking and lift studies ensures alignment with immediate optimization opportunities from lift with long-term growth trajectories from brand tracking.

APPENDIX: DETAILED RESPONSES:

KANTAR TOTAL MARKETING ROI (TMROI)

Methodology used to measure lift/ROI/ROAS:

We use a comprehensive approach to marketing effectiveness assessment by quantifying both the short-term and long-term impacts on sales/revenue resulting in a Total ROI measurement. Usually calibrate "measured" Sales to project to Total sales reflecting market population based on first party Shipment data. Our marketing mix model approach uses time series data to isolate Advertising lift by channel, controlling for all other marketing inputs and uncontrollable factors like seasonality and macro-economic variables. The model results are used to quantify the impact of advertising and ROI by channel, campaign or creative. Define ROI = (Incremental revenue or profit from media * Gross Margin/ Media Investment) . Typically, we report revenues that are adjusted for profit margins. ROI is usually computed based on working media dollars only, as non-working media investments are difficult to estimate for all channels on an equitable basis.

Steps typically taken to enable analysis to be projectible to the target population

Kantar' market mix modelling approach can model to the market populations. Usually calibrate "measured" Sales to project to Total sales reflecting market population based on first party Shipment data.

How other factors that could affect the dependent variable are controlled

Use a multi-variate model that controls for impact of category sales trends, demand/supply shocks to the system (e.g., new entrants in adjacent categories, stock-outs, distribution losses), weather, seasonality and macro-economic variables that are most relevant to category (e.g., gas prices, disposable income, CPI).

How analysis accounts for . .

A. Diminishing returns: Model specifications allow us to estimate curves with diminishing returns for the different channels evaluated. Diminishing returns curves are based on impressions = reach * frequency, incorporating both R/F metrics at once. Use Reach/ Frequency by channel as diagnostic overlay to understand or explain saturation levels. In establishing the Saturation curves, test for different functional forms such as S-Curves, Log Curves and Power curves. Able to give guidance on thresholds , optimal and saturation levels for every channel and campaign based on the diminishing returns curves.

B. Baseline consumption, behavior, or purchases: The model specification and modeling technique produces estimates for baseline volume. The modeling technique that Kantar deploys provides a dynamic estimate of the baseline where we are able to capture the time-varying impact of baseline purchase or consumption. The baseline is a modelled outcome metric and includes a trend that gives an indication of brand's longer-term demand trajectory in the absence of immediate marketing inputs.

C. Pre-campaign sales data: The longitudinal nature of our models include by definition pre-campaign sales and other marketing activity.

D. Halo effects of sister brands: Include specific variables to capture the halo effect from other brands' marketing activity. To capture Halo effects, our model for any sub-brand includes marketing spend/impressions for all sister brands and the master-brand as independent variables. Investigate the ability to include sister brand effects by channel to get as much granularity as possible in estimating halo effects.

E. Adstock: Our ad-stock transformation to incorporate carry-over is a function of current period media spending and previous period. Evaluate the retention parameter for every channel/campaign by testing a range of retentions using a grid search and picking the retention parameter with the largest correlation with the dependent variable.

F. Competitive activity: Include competitive media spend and other metrics to account for competition in the models.

G. Interactions/synergies between media: Use a Bayesian DLM approach to identify synergies by identifying channels whose contribution increases/decreases simultaneously due to synergies. Also explicitly test synergy impact in the models by testing an interaction term. We also use a multiplicative model which incorporates synergies in the modeling process itself.

How exposures across devices and channels are de-duplicated

We do not de-deduplicate exposures across devices and channels in MMM estimation; however we use duplication exposure data across channels to explain campaign performance results in MMM.

How creative and media effects are distinguished

Kantar has a rich history of testing and learning on how creative delivers impact, and an AI-based solution to score all creative ads at scale. We incorporate creative quality scores in the model along with media pressure variables. This allows us to quantify the impact of both media weight and creative quality on sales and brand equity, and provide guidance on how to maximize the impact of advertising investment.

Other validation techniques used

We use sample hold-out period (typically, 6 months) where we compare model-based forecast to actual performance. We compare model performance on parameters such as MAPE. Also leverage real time testing using a test-control approach based on model recommendation to increase/ decrease spending in specific channels.

APPENDIX: DETAILED RESPONSES:

LEADSRx

Methodology used to measure lift/ROI/ROAS:

LeadsRx utilizes seven unique attribution models to provided marketers the flexibility to measure their campaigns with the most appropriate attribution model for their campaigns. Return on Ad Spend is calculated by looking at the cost of an advertising grouping compared to the revenue received from conversions attributed to this grouping. Broadcast campaign web lift is calculated by looking at a "response window" and utilizing a "geo fence" surrounding a market in which an ad campaign was deployed. The response window, in combination with the geo fence, helps determine the amount of incremental web lift was experienced by the website being advertised.

Sources and types of data on walled gardens

LeadsRx tracks ad clicks from all digital sources including Google Ads, Facebook Ads, Bing Ads, and more. In addition, the product can track ad impressions from Google, DoubleClick, and other DSPs.

Steps typically taken to enable analysis to be projectible to the target population

None. Our product only analyzes witnessed events; i.e., ad clicks, ad impressions, website page views, etc. We do not "project" this to target populations... we only report on what the population previously targeted did.

How analysis accounts for . .

A. Pre-campaign sales data: This is used to determine a baseline and is part of the lift calculation

B. Interactions/synergies between media: We look at all marketing interactions and how they work together in the path to conversion. We use standard and proprietary attribution "models" to incorporate this data.

How exposures across devices and channels are de-duplicated

LeadsRx de-duplicates conversions and business outcomes which are determined to be duplicative. Our methodology is based on multi-touch attribution and includes the sum of all marketing touchpoints across all channels. We believe if a customer engages with a particular channel multiple times it should be part of the ROAS equation and should be treated like any other marketing touchpoint (rather than be de-duplicated).

How creative and media effects are distinguished

When measuring creative effects, clients may be running a variety of creative messages across all of their broadcast campaigns. Each one of these creative efforts can be ingested independently, regardless of media (TV or Radio) to determine the effects of creative and to provide estimates on its effects into the future.

Other validation techniques used

Constantly compare our own aggregate results to publicized results from other industry leading software providers in the marketing space. Furthermore, LeadsRx is an integrated partner with Google Display Ads, Google Tag Manager, Google Analytics, Facebook Ads, Adroll, Adobe and other software which give LeadsRx insight into industry, category and product specific marketing metrics to compare.

APPENDIX: DETAILED RESPONSES:

LUCID

Methodology used to measure lift/ROI/ROAS

The primary goal of an Impact Measurement study is to measure attitudinal changes as a result of the campaign. For this, Lucid sends an identical survey to two survey populations:

A. Exposed Group: a random subset of those exposed to a given media campaign.

B. Control Group: a group of unexposed audiences either recruited from a holdout or matched to mirror the exposed group based on demographic, media and category behaviors.

In the majority of cases, exposure is measured with Lucid's tracking technology. Marketers embed the Lucid tracking tag into owned content & paid media to gather information like where the ad/message rendered, the creative that was shown. It can also track custom variables that are dynamically shared by the client's ad server or media platform. The pixel fires each time an ad is rendered, allowing Lucid to append exposures to its 1st-party respondent cookie. The next time that user returns to Lucid Marketplace, they may be qualified into the Impact Measurement survey as an exposed respondent. Lucid also connects to exposures via its direct syncs with data platforms such as LiveRamp, TapAd, Neustar, Oracle & Lotame. Lucid also has direct integrations with Amazon and Samba TV.

Steps typically taken to enable analysis to be projectible to the target population

Each campaign is unique, and each category has distinct equity & usage drivers. Therefore, for each campaign, a custom weighting analysis is conducted to make sure that the test & unexposed groups are matched on the factors that matter most. Three levels of weighting are used in Lucid Impact Measurement studies to ensure the exposed and control samples are representative of the target audience:

A. Demographic Weights - One of the key benefits of the Lucid sampling and data collection platform is that there are dynamic processes to control who enters the survey and who is assigned to a test or unexposed group. Therefore, the test & unexposed respondents end up being very similar on key demographics. In addition to quota management that Lucid provides on-platform, custom demographic weighting can also be included if it is relevant for the category (e.g. a retailer with most of its stores on the West Coast). The weights applied on demographics tend to be rather small, rarely reducing sample efficiency below 95%.

B. Media Usage Weights - There are 2 primary media-related metrics used to balance the test and unexposed cells: (1) mobile vs desktop usage, and (2) stated television viewership. Industry learnings and our analyses show that consumers on mobile devices react to advertising differently and answer surveys differently than consumers on desktop. The Lucid system automatically detects the consumer's device and the test/unexposed cells are matched on this metric. Depending on the details of the media campaign, a TV viewership weight may be recommended. This is particularly relevant when there is a TV (or other high-reach media) campaign in market at the same time the digital campaign is live.

C. Category Propensity Weights - A key differentiator for Lucid Impact Measurement is category propensity balancing. This final level of weighting assures that the test and unexposed groups are matched on attributes that drive category behavior. Without this balancing, it is possible (and likely) that results show exaggerated increases or decreases in key metrics.

While typically the weighting factors are "questions" asked of the respondent, it is also possible to weight on 1st or 3rd-party segment data that is appended to the survey database (via Liveramp, Neustar, Lotame, etc.)

The 3 levels of weighting are combined. All weighting is applied to the unexposed cell, as the exposed/test sample represents the best information on the true makeup of the consumer profile reached by the campaign.

Control group

A. How it is selected: Control methodology varies depending on channels in which the client is looking to measure and their ability to enforce a "holdout" group within the campaign footprint.

   a. Digital/ACR channels primarily leverage a synthetic control method of matching exposed based on demographics, media consumption, category propensity. In some cases, Lucid can recruit from a holdout audience specified by publisher/platform.

   b. Offline Media is generally measured via Opportunity to See, where control is matched to exposed on offline viewing/listening propensities and self-reported viewership

   c. Addressable TV control is recruited via the MVPD provided holdout group and additional set of OTS questions to reduce potential contamination from other channels. Results are weighted to match exposed group on audience proportions to mitigate response bias

B. Steps taken to ensure that control group members have not been exposed: Lucid implements tracking of digital creative via its tracking pixel technology as well as direct integrations with publishers and media platforms. This is connected to the Lucid Marketplace (a network of panels) to identity the unexposed audience of respondents. Lucid uses a combination of survey-based and passive controls to mitigate the risk of control contamination within the measurable population due to cookie deletion and other limitations. Lucid uses its proprietary identity graph to prevent control surveys from reaching exposed panelists. When possible, Lucid may also recruit from a holdout group exclusively.

C. Steps taken to ensure test and control groups are similar and representative of target population

Tracking Exposure to Offline Media (OTS)

For offline media, such as radio and TV advertising, the process relies on what is referred to in the industry as OTS (Opportunity-to-See) logic. The OTS approach uses stated behavioral data collected in the survey, along with other metadata or profiling data (i.e. location, date of interview, etc.) to calculate the propensity that a given respondent was exposed to the offline media.

The process of creating an OTS grouping is a process of elimination, but the logic is not a simple "yes/no," especially when dealing with broad reach, non-addressable media like Broadcast TV. For each campaign, an OTS model is custom-built because each campaign is different, containing different media channels with different media buy profiles.

For broadcast media such as TV, the media plan guides the inputs used to create an OTS model. The models are driven by a customized, multi-step survey design guided by the media plan and other campaign details. Consumers' responses to those survey questions allow for the development of a model to determine the propensity (or likelihood) that a given respondent is exposed to an offline campaign.

Based on (1) planned # of impressions, estimated reach, or GRPs; (2) specific shows in the buy; and (3) respondents' answers to the behavioral and profiling questions, the propensity of any given respondent to have been exposed to the TV campaign is calculated. Those with high likelihood to have been exposed are coded as "Exposed to TV," while those with low likelihood of exposure are coded as "Not Exposed."

IP Matching and Household-Level Exposure

OTS is also relevant when the exposure data is at the Household level (i.e. IP-based matches and SmartTV data). Anyone in the Household could have been exposed, therefore OTS questions are added to further qualify the individual taking the survey. For example, further qualifications are driven by understanding the apps the respondents use, or type of TV programs they watch.

Cross-Media Grouping

Once all the OTS groups are calculated, cross-media combinations are calculated by cross-referencing at the respondent level the different OTS groups. For example, a TV+Digital group is comprised of respondents that were exposed to at least 1 digital element of the campaign and were also coded as "Exposed to TV."

Validation of Opportunity-to-See Using ACR TV Exposure Data

Approach: Collect OTS and campaign metrics on a sample of consumers that overlapped with a panel of ACR (Automatic Content Recognition) SmartTV homes.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: This can be determined based on a pre-campaign questionnaire or evaluated by matching to client datasets via Lucid data & DMP integrations (LiveRamp, Neustar, Oracle, etc)

B. Halo effects of sister brands: To measure the halo effect of a campaign, the respondent may be prompted with a series of questions to understand their awareness across product lines/services, past purchase activity, message association, likability or future intent.

C. Competitive activity: Typically evaluated in questionnaire design where consumers rank competitors by opinions, preference and recall

D. Interactions/synergies between media: Deduplication of media exposure, one-to-many analysis. Can be evaluated on last touch or multi-touch approach as needed. Lucid connects cross-media exposures directly to the user leveraging its tracking technologies (described earlier). For offline channels, we provide OTS and ACR data at the respondent level to de-dupe exposures. In addition to user-level attribution, Lucid uses control methodology to further isolate the effects of advertising by media format/channel.

How exposures across devices and channels are de-duplicated

Desktop / Mobile Web - Lucid has developed a 1x1 image tag which is widely adopted by major ad servers and publishers. This tag collects information like where the ad rendered, the creative that was shown, and can also track custom variables that are dynamically shared by the client's ad server or media platform. The pixel fires each time an ad is rendered, allowing Lucid to append exposures to its first party respondent profile. Lucid maintains a universal ID for each respondent that is separate from its third-party cookie and further enhanced by suppliers who provide opt-in based, logged in panelist identifiers.

Mobile In-App - In cookie-less environments, such as Mobile applications, publishers may pass-in the Mobile Advertising ID within the standard tag described above. Lucid will then match to the respondent database using the mobile Ad Id provided by the suppliers or through its integration with LiveRamp IdentityLink. Lucid's identity graph maintains connections of respondents to cookies and Mobile Ad IDs for this purpose. If the publisher cannot pass the Mobile Ad ID dynamically on exposure, they may choose to onboard these via secure file transfer to Lucid's platform.

Connected TV - For ads that render within over-the-top or connected television devices (e.g. Roku, Hulu, etc.) Lucid matches based on the Household IP address of that respondent. Typically, Lucid will also qualify the survey with Opportunity-to-See questions (see section 2.3) to help ensure the respondent who completed the survey was the same person in the Household that was exposed to the ad.

Other Pixel-less Environments - Lucid is undergoing direct integrations with publishers in order to provide scalable measurement for environments that do not support 3rd-party measurement tags.

How creative and media effects are distinguished

Lucid determines creative effects based on recall specific questions that tailored to the brand message or creative tactics. This is evaluated in conjunction with media to distinguish key drivers of lift.

Other validation techniques used

All statistical testing is conducted using the effective base size to account for the impact that weights have on statistical testing power and confidence. Effective base sizes are typically reported in the dashboard deliverables used for most Impact Measurement studies. Statistical testing in the dashboard deliverables default to a two-tailed t-test at 90% confidence level when comparing 2 percentages (i.e. % aware in the exposed group vs % aware in the unexposed group). Minimum sample size for analysis can also be toggled by the user. The default setting is typically n=50, but this default can be changed project-by-project or account-by-account. As a user applies filters in the dashboard, if either the exposed or unexposed group is reduced to a sample size under the stated threshold, the chart/table will go blank.

As part of additional analyses, we may provide correlation analysis, especially when measuring the impact of ad frequency. We may also conduct multivariate analyses, regressions, etc. when the research question requires this statistical testing approach.

APPENDIX: DETAILED RESPONSES:

MARKETING EVOLUTION

Methodology used to measure lift/ROI/ROAS

Marketing Evolution utilizes an econometric model of consumer decision estimated with Bayesian learning/forgetting updating algorithm using scalable (human-touch free) machine intelligence. When the model is updated, it can be used to directly compute factual and counterfactual choice probabilities for lift/return/contribution and marginal effects for optimization. All measurements are reinforced with data verification and results validation along with optimal testing strategy recommendations to improve measurement precision and bias amelioration.

Sources and types of data on walled gardens

Facebook for Aggregate, Lift Studies, and person exposure group. Amazon for sales and media. Pinterest and Twitter for market DMA weekly level.

Steps typically taken to enable analysis to be projectible to the target population

In preparation of data for impact measurement, we sample the data to make it representative of the focal market universe. Typically this would be US population, but could be custom defined to more limited geography. Once marketing impact is recovered, composite audiences (populations) can be targeted as an objective of scenario planning.

Control group selection and validation

A. How it is selected: Conditional random selection. Subsequent tests are conducted for representativeness, and multidimensional weighting to population/focal market is computed and applied. Validated by repeated evaluation of recommendation, that is, did the recommendation generate the impact it estimated when activated?

B. Steps taken to ensure that control group members have not been exposed: We control for the extent to which they've been exposed prior to the experimentation window as additional features in the model. This is how we deal with this problem, rather than pretending you can have a clean lab experiment in the marketplace: Exploit the added experimentation variation you have rather than throw it out for lack of purity. Then focus on managerial objective validity (did the insight and recommendation improve the managerial objective), rather than statistical threshold disconnected from managerial objective.

C. Steps taken to ensure test and control groups are similar and representative of target population: RIM weighting across three main dimensions simultaneously with many sub dimensions -- people representativeness, exposure representativeness, outcome representativeness. Importantly the random control data is included in the comprehensive model to control for the field factors, including arrival or eligibility into the test set. We also make recommendations about how much testing to do to avoid over-testing or under-testing from a managerial objective standpoint.

How other factors that could affect the dependent variable are controlled

We evaluate test results within the model instead of in isolation. Random field tests are not random to eligibility, measure-ability, or match-ability. These factors are well-controlled for in the consumer choice model specification.

How analysis accounts for . .

A. Diminishing returns: Mathematical specification of a consumer choice model that admits a response function with negative second order condition (second derivative is negative) over relevant neighborhood logarithmic and soft-max combined form.

B. Baseline consumption, behavior, or purchases: Fixed and random effects in the consumer choice model, purchase cadence, frequency and recency state-dependence terms. (Dube, Rossi, Hitsch RAND 2010).

C. Pre-campaign sales data: Of the sample of several million consumers typically utilized for a model update, the model training recovers the equivalent of a model intercept term for each. This term captures unique persistent aspects of a composite consumer's baseline propensity to convert. These include an individual's inherent tastes for the focal choice, but also other unobservable aspects of that composite consumer's journey, including media exposure and other features of the marketing environment and marketing mix not specified as separate explanatory variables in the consumers decision model.

D. Halo effects of sister brands: Unobserved factors such as media for a sister brand are captured and controlled for in the model specification with geographic and time (day in week and week in month). In cases where the client has media exposure for this halo media, it is directly specified in the implementation (model specification)

E. Adstock: Geometric continuous time-stamp decay. The term in model is sum over exposures that have each been depreciated by the estimated decay term lambda^ (time of conversion - time of exposure).

F. Competitive activity: Measured - exposure, modeled- spacio-temporal effects updated weekly. Where there is high competition, one expects a negative impact (all else equal) to a focal brand's conversion. Where that is the case, the model will estimate that relative effect. Because it is captured, it means a lower baseline rate of conversion, and also results in lower impact of media.

G. Interactions/synergies between media: Multiplicative specification of the general Cobb-Douglas form, combined with other specified model nonlinearities that capture second order effects related to relative timing and consumer state (e.g. location of choice or history or choices, searches, purchase) The longer the period between exposure, then the less the interactivity. The higher the consumer's baseline value (utility) is for a choice, the more responsive they are to media complementary to that choice; this is the assumed form for media with positive impact, the extent of which is an empirical matter determined by the data.

How exposures across devices and channels are de-duplicated

We make use of a cross device to person ID graph and build the unique exposure in the journey. Take in all log level exposure, then resolve to identified person ID.

How creative and media effects are distinguished

Model is specified at the creative/tactic level. The level of variation information in data determines the extent to which creative effectiveness varies within and across media. If there isn't enough variation the solution recommends investments to gain that variation information.

Other validation techniques used

We test representativeness of the data against aggregate ledgers over time, geo, population; we verify the logical consistency of the measured marketing impact, recommendations and activation using a comprehensive test/learn framework that evaluates against business objectives and ROI of the Media. Once exposure and conversion/non-conversion is resolved to identity, we sample and weight the data to make it representative of the overall level of exposure and conversion activity across the focal market population (all three dimensions simultaneously), using RIM weighting and scaling.

APPENDIX: DETAILED RESPONSES:

MERKLE

Methodology used to measure lift/ROI/ROAS:

Our solution is flexible in that we measure lift using various approaches. Marketing Mix Models and Multi-Touch Attribution models are used to leverage historical data for measurement solutions. Experimental design is used for single lift analyses when historical data is not available or when the method is preferred.

Sources and types of data on walled gardens

Leverage 1st party data, clean rooms, and summarized feeds from the Walled Gardens.

Steps typically taken to enable analysis to be projectible to the target population

Our analyses are designed and built to measure total and target populations.

Control group

A. How it is selected: Control groups are selected based on statistical assessment of study feasibility. The groups can be individuals or markets, depending on the test, so there is no single selection method that works in all cases. Typically, these are random holdouts.

B. Steps taken to ensure that control group members have not been exposed: Depends on the test, but through our M1 and PAM addressable media capabililties at Merkle, we can target to an individual, thus ensuring they are not exposed. We also pull data files for exposures to ensure we are capturing any bleed into control.

C. Steps taken to ensure test and control groups are similar and representative of target population: We do a lot of modeling to design the tests, using clustering and LAL models, for example, to ensure statistically valid test and control groupings.

How other factors that could affect the dependent variable are controlled

We have access to data sources that help predict dependent variable changes, and these vary by industry. Specifically, we maintain databases of weather, economic, competitive media and other industry relevant data for use in each solution. Our analyses can then be structured to control for externalities, giving us a clean read on marketing impacts. In addition, our DataSource asset is a differentiator in that we can leverage person or HH level information (i.e. demographics, lifestyle, household, wealth) in our solutions.

How analysis accounts for . .

A. Diminishing returns: Estimated custom for each client. Our models estimate the shape of the diminishing returns curves. Based on historical data, these curves are then used in planning investment and impression volumes.

B. Baseline consumption, behavior, or purchases: It really depends on the analysis. For statistical model-based solutions, the baseline measures are estimated using client-specific trend data or external variables . When doing experimental design/structured testing, the baseline is captured via the test/control measurement methodology when performing lift analysis.

C. Pre-campaign sales data: Inclusion of historical sales data

D. Halo effects of sister brands: Models include all marketing across all product lines/brands, often using advanced statistical methods. .

E. Adstock: Empirically estimated custom for each client solution, leveraging our proprietary algorithms. Inputs for calculating adstock are client media data (impressions, clicks, views, mail pieces sent, etc.) and the dependent variable. The relationship between these two (media and dep var) are estimated to find the best statistical fit, which represents the unique adstock for each client solution. We also leverage knowledge from our broad database of adstock measurement to verify/validate each model against.

F. Competitive activity: Access to data sources and then included in models. Competitive data sources can be categorized into 2 groups:

    i. External tracking sourced and managed by Merkle.

    ii. Client/agency sourced; in many cases our clients or their agencies already subscribe to 3rd-party competitive media data tracking.

G. Interactions/synergies between media: Leverage advanced statistical methods to understand synergies and customer journey modeling to understand interactions. Journey modeling helps to uncover how customer exposure to multiple media leads to better outcomes.

How exposures across devices and channels are de-duplicated

We have an event stream data and modeling practice, which includes data management to design and construct event streams reflecting de-duped exposure data. This also leverages our Merkury identity solution, giving us unmatched scale in creating accurate event stream data

How creative and media effects are distinguished

The models leverage variables defined by media and creative types, allowing us to model at the creative level within a medium to help distinguish between performance levels. Additionally, we leverage AI and ML to uncover creative asset feature performance through a proprietary algorithm, which is tied into our MTA solution.

APPENDIX: DETAILED RESPONSES:

MOAT by ORACLE DATA CLOUD

Methodology used to measure lift/ROI/ROAS:

We use a proprietary forensic test and control methodology based on the principles of causal inference to measure sales lift. A synthetic control is constructed from the eligible unexposed population to match the exposed population on all important dimensions. Using a two-stage modeling process to reduce variance and bias, Oracle Data Cloud estimates lift and significance for the overall campaign and many subpopulations. The first model removes the audience/targeting impact. The second isolates the media effect of the campaign. Final campaign results are calibrated to account for unmatched households.

We measure lift during the campaign period but predict for what we believe lift would be during the campaign period + 4 week post period. We also estimate what we believe the incremental impact will be over the following year due to a change in behavior from the campaign.

We deliver weekly sales lift results in the Moat Outcomes UI as soon as two weeks into a campaign, providing cross-campaign topline and granular ad tactic results across placements, targets and creatives, so that an advertiser can pull levers to optimize their campaign inflight.

Sources and types of data on walled gardens

We have direct integrations with all the major walled gardens/social platforms. We receive exposure data for the relevant time period we are measuring, leverage our offline matches with each platform and the ODC ID graph to resolve to a HH, and map that to our licensed and O&O CPG transaction data for CPG verticals, as well as to credit card data for retail/restaurant clients, ODC licensed demographic data and ODC reference data. This combined dataset is the basis for all of our analysis.

Steps typically taken to enable analysis to be projectible to the target population

After computing lift for the target population using our measurable universe, we use sales and brand penetration inputs from clients and our in-house panel to re-calibrate results to account for missing transactions. We further adjust results to account for the portion of exposed individuals that were unmatched.

Control group

A. How it is selected: The control-eligible definition varies by publisher, but it is a population that was active on the respective publisher where the media was run, but was not exposed to the campaign of interest. ODC then weights the control-eligible population to resemble the exposed population over a number of different covariates.

B. Steps taken to ensure that control group members have not been exposed: We lean on and expect that each publisher's data is accurate.

C. Steps taken to ensure test and control groups are similar and representative of target population: We measure a number of different dimensions to ensure that the two populations are not statistically different with respect to pre-period sales, propensity to be exposed to the ad, etc. We both stratify and re-weight to create a forensic control that is representative of the exposed audience. Stratification is enlisted to ensure balance in the distribution of discrete variables (e.g. various demographic variables and publisher activity features). Our re-weighting methodology generates weights such that the forensic control distribution matches the moments of the exposed distribution on various continuous variables, e.g. pre-campaign sales data. We calculate a propensity to be exposed for each household and also predict expected outcome variables for each household during the campaign period.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Using our forensic control, we build a model to predict campaign sales based on many features including pre-campaign sales, platform activity, and demographic information. This model is then leveraged to predict counterfactual sales for exposed HHs, i.e. we predict what their campaign sales would have been had they not been exposed to the advertisement.

B. Pre-campaign sales data: Pre -campaign sales are used in defining our forensic control as well as modeling. We re-weight unexposed HHs to ensure they match the exposed distribution on pre-campaign spend variables up to multiple moments (e.g. mean, variance, skewness, etc). Additionally, pre -campaign spend variables are used in a model to predict counterfactual behavior for exposed HHs.

Other validation techniques used

We surface multiple QC metrics that assess: the fit of our model, balance between our forensic control and the exposed audience, and sensitivity in estimates to influential data points. Additionally, we conduct in-house simulation testing where a known lift is simulated according to various models. We then test our methodology's ability to accurately (unbiased) detect the simulated lift. We test both the ability to detect lift when present as well as ensure that we don't detect lift when zero lift has been simulated.

APPENDIX: DETAILED RESPONSES:

NCS SALES EFFECT

Methodology used to measure lift/ROI/ROAS

NCS employs two multivariate causal methodologies including a matching algorithm and a machine learning algorithm to conduct Sales Effects. We use TMLE (Targeted Maximum Likelihood Estimation as our model for machine learning. We have built a SuperLearner (or Ensemble Model) which combines the effects across multiple ML methods.

Sources and types of data on walled gardens

NCS has developed a "private cloud friendly" version of Sales Effect that we have successfully deployed to publisher walled gardens. This allows us to measure sales lift for the walled garden publisher's media using NCS encrypted purchase data. We can also bring in and comingle other media exposure data to do cross media studies at walled gardens.

Steps typically taken to enable analysis to be projectible to the target population

NCS uses a household level projection based on Frequent Shopper Data (FSD, data from the cards used in supermarkets and drug stores to track purchases) observed in conjunction with Nielsen Retail Measurement Service, Nielsen Homescan Panel and census level geographic distributions. The universes we match to are US Census for households, Nielsen's Retail Measurement Service for sales, and Nielsen People Meter for TV ratings.

Control group

A. How it is selected: There are 2 possible scenarios. Scenario #1: NCS generally uses a synthetic control balanced across 200 variables. These variables include purchases of brand, key competitive brands, and category for a wide range of time variables, including the entire year pre-period and many segments within that year. They also include demographics, geographics and media usage where available. Scenario #2: Publishers provide random controls that need to be balanced control to the test across match rates, demo and pre-purchase variables.

B. Steps taken to ensure that control group members have not been exposed: First, we work with our publishers to have the highest match rates possible. Second, we compare the reach of the campaign as measured in our data compared to a measurement in a currency quality source to understand the level of contamination that might exist. Currency quality sources for such comparisons include Nielsen People Meter service for TV, MRI for magazine total readership, Nielsen Radio service for listening, Nielsen's Retail Measurement Service for store sales, Nielsen's Homescan for penetration, Census for basic demos by geography. Third, we include active files where available and intab status where available to ensure that we are only including people or homes where exposure would have been known.

C. Steps taken to ensure test and control groups are similar and representative of target population: We balance control groups to the test group across up to 200 variables including geography, demos and brand and category purchasing.

How other factors that could affect the dependent variable are controlled

NCS uses statistics on purchasing data to ensure that the homes included in a study all have longitudinal "good" reporting data. NCS also includes price, promotion and distribution. Price and promotion are generally used only for the brand in question but include variables that compare the brand price to the category price. Distribution is for both brand and category.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Purchases for the brand and category dollars are tracked for each HH across the prior year.

B. Pre-campaign sales data: One-year prior brand and category sales

C. Halo effects of sister brands: For brands that request this, either advertising for sister brands can be measured or purchases of sister brands influenced by advertising can be measured. This is a common inclusion.

D. Competitive activity: Purchasing of competitive brands are included in prior year purchase history, both as individual brands and as category purchases across time. Competitive media activity is generally not included.

E. Interactions/synergies between media: Whenever a cross media campaign is measured, synergy between the media is included.

How exposures across devices and channels are de-duplicated

NCS uses a third-party matching partner and onboarders to connect all exposures to the same household.

How creative and media effects are distinguished

By separating the purchase occasions that are exposed and those that are not exposed, we can divide the incremental sales into Incremental Sales per Exposed Category Occasion and % Category Purchase Occasions Reached. The reached portion contains all variability across reach, targeting, seasonality and flighting which leaves Incremental $/Exposed Category Occasion measuring the impact of creative in context.

APPENDIX: DETAILED RESPONSES:

NCS SALES LIFT METRICS (SLiM)

Methodology used to measure lift/ROI/ROAS

NCS employs a multivariate causal methodology based on a machine learning algorithm to conduct Sales Lift Metric studies. We use TMLE (Targeted Maximum Likelihood Estimation as our model for machine learning. We have built a SuperLearner (or Ensemble Model) which combines the effects across multiple ML methods.

Steps typically taken to enable analysis to be projectible to the target population

NCS uses a household level projection based on Frequent Shopper Data (FSD, data from the cards used in supermarkets and drug stores to track purchases) observed in conjunction with Nielsen Retail Measurement Service, Nielsen Homescan Panel and census level geographic distributions. The universes we match to are US Census for households, Nielsen's Retail Measurement Service for sales, and Nielsen People Meter for TV ratings.

Control group

A. How it is selected: NCS uses a synthetic control balanced across 200 variables. These variables include purchases of brand, key competitive brands, and category for a wide range of time variables, including the entire year pre-period and many segments within that year. They also include demographics, geographics and media usage where available.

B. Steps taken to ensure that control group members have not been exposed: First, we work with our publishers to have the highest match rates possible. Second, we compare the reach of the campaign as measured in our data compared to a measurement in a currency quality source to understand the level of contamination that might exist. Currency quality sources for such comparisons include Nielsen People Meter service for TV, MRI for magazine total readership, Nielsen Radio service for listening, Nielsen's Retail Measurement Service for store sales, Nielsen's Homescan for penetration, Census for basic demos by geography. Third, we include active files where available and intab status where available to ensure that we are only including people or homes where exposure would have been known.

C. Steps taken to ensure test and control groups are similar and representative of target population: We balance control groups to the test group across up to 200 variables including geography, demos and brand and category purchasing.

How other factors that could affect the dependent variable are controlled

NCS uses statistics on purchasing data to ensure that the homes included in a study all have longitudinal “good” reporting data. NCS also includes price, promotion and distribution. Price and promotion are generally used only for the brand in question but include variables that compare the brand price to the category price. Distribution is for both brand and category.

How analysis accounts for . .

A. Diminishing returns: Continuous measurement includes sharing the decay in effects week-over-week from prior weeks' advertising.

B. Baseline consumption, behavior, or purchases: Purchases for the brand and category dollars are tracked for each HH across the prior year.

C. Pre-campaign sales data: One-year prior brand and category sales

D. Competitive activity: Purchasing of competitive brands are included in prior year purchase history, both as individual brands and as category purchases across time. Competitive media activity is generally not included.

How exposures across devices and channels are de-duplicated

NCS uses a third-party matching partner and onboarders to connect all exposures to the same household.

How creative and media effects are distinguished

By separating the purchase occasions that are exposed and those that are not exposed, we can divide the incremental sales into Incremental Sales per Exposed Category Occasion and % Category Purchase Occasions Reached. The reached portion contains all variability across reach, targeting, seasonality and flighting which leaves Incremental $/Exposed Category Occasion measuring the impact of creative in context.

Other validation techniques used

The ongoing measurement is compared to the final total campaign measurement.

APPENDIX: DETAILED RESPONSES:

NEUSTAR

Methodology used to measure lift/ROI/ROAS

Both econometric time series and binary logistic choice methodologies to calculate incremental lift

Sources and types of data on walled gardens

Market, person-level and user-set impressions, clicks, and activity metrics sourced from clients, agencies, and walled gardens.

Steps typically taken to enable analysis to be projectible to the target population

We leverage both geographic weights and our ElementOne (E1) audience intelligence platform to scale our results, where there are completeness challenges, to the entire population. When the data sources are not census, we use our segmentation schema, which is representative of the entire US population, to balance and project the analysis data to the total population.

Control group

A. How it is selected: The control group is typically selected collaboratively by the client and their vendors, including Neustar. Once the population that is being targeted has been defined, we leverage our ElementOne segmentation solution, which has groupings of similar individuals and households, to select both the test and control group from specific ElementOne segments.

B. Steps taken to ensure that control group members have not been exposed: Verify that the integrity of the control group is intact through post-hoc examination of exposure logs. In addition to working with clients to develop and syndicate audiences via our IDMP to enable both exposure and suppression to the test and control groups, respectively, also look at their actual media exposure during the test period via the marketing events (offline and online) captured by IDMP.

C. Steps taken to ensure test and control groups are similar and representative of target population: Depending on the test framework, we may use demographic factors, geography and intention indicators. Intention indicators can include online browsing, web visitation, and prior purchase behaviors that are specific to each of the individuals in both the test and control groups to ensure they are similar to each other and then broadly similar to the target population as a whole.

How other factors that could affect the dependent variable are controlled

Using both econometric times series and binary logistic choice methodologies, we control for all factors that could affect the dependent variable. In addition to measuring the incremental impact of the marketing exposure in conversion, we also control for the impact of customer factors and other marketing and exogenous factors that could affect the dependent variable. The impact of customer propensity is captured via that likelihood of purchase at the E1 segment level, prior purchase behavior at the converter level, and observed organic browsing behavior. Other marketing factors include price, discounting, inventory, distribution, brand health, earned and owned marketing, sponsorships and events, salesforce, product launches and product quality, store and web visits, etc., that are captured in the MMM model using time series data. Exogenous factors such as seasonality, macroeconomic factors, competitor activities, such as marketing, product launches, pricing, online buzz, online search, industry trends, etc., are also captured in the MMM model using time series data. The impact of consumer factors, market-level marketing factors, and market-level exogenous factors, are then controlled for in the logistic choice models (MTA) as features with values that are distinct at the week and cross-section level calculated from the MMM model.

How analysis accounts for . .

A. Diminishing returns: Use of a model that accounts for non-linearity, with an adjustment for exposure frequency

B. Baseline consumption, behavior, or purchases: Onboard CRM and historical transaction files, and leveraging our E1 audience intelligence platform to compare the propensity index of percent of population E1 segment represents in the customer's transactions vs. the population.

C. Pre-campaign sales data: Build a propensity component that reflects preexisting brand and product disposition. The propensity component includes not just brand likelihood but also specific past purchase behavior impact for each converter.

D. Halo effects of sister brands: All sister brand marketing activity that is conducted and can either be tracked at the user-level or measured at the market level are incorporated into the MMM and/or MTA depending on the available data. Sister brand marketing activity is brought in in the same format as main brand marketing.

E. Adstock: Leverage a lag, build, peak, persistence and decay approach

F. Competitive activity: Leverage 3rd party marketing, sales, pricing and product data; Kantar Media for offline marketing data, Pathmatics for online marketing data; product launch data is built from client or publicly available data for key products, pricing is sourced either from the client or, where available, 3rd party data companies; online buzz data is sourced from Crimson Hexagon, and organic search activity data is sourced from Google.

G. Interactions/synergies between media: Model structures incorporate synergies, with a log-log multiplicative form for the econometric time series models and with complete customer journeys in the binary logistic choice models

How exposures across devices and channels are de-duplicated

We leverage our omnichannel offline and online identity resolution system, OneID, to de-duplicate exposures across devices and channels when those exposures may be present in multiple data sources.

How creative and media effects are distinguished

Campaign level analysis in our binary logistic choice models enables us to estimate the difference in performance and lift from media versus creative effects. For econometric time series models, where available, leverage creative performance measures to control for the impact of creative and isolate the media effects impact.

APPENDIX: DETAILED RESPONSES:

NIELSEN

Methodology used to measure lift/ROI/ROAS

Nielsen Market and Buyer Lift both rely on a test vs control, pre vs post methodology to measure Lift/ROI/ROAS for observational modeling. When a partner randomizes media delivery, Nielsen uses a randomized control trial methodology. (Nielsen also offers Nielsen Attribution solutions and Nielsen MMM, which employ different methodologies.)

Sources and types of data on walled gardens

Nielsen has a number of different approaches to sourcing and analyzing walled gardens. We have a number of ways of collecting exposure data; for example, we use third-party tags, server-to-server integrations, direct aggregated flat files, and direct exposure file matches among other means.

Steps typically taken to enable analysis to be projectible to the target population

For Nielsen Market Lift, analyses are designed to be representative and projectable by selecting markets with average brand and category development, balanced demographics, sufficient sample size of stores or HHs, etc. For Nielsen Buyer Lift, panels and other calibrations are used to ensure proportional and projectible coverage.

Control group

A. How it is selected: Within our Campaign Lift solution, we have two approaches:

   a. Nielsen Market Lift employs a 1: many match between test and control stores using a Synthetic Control Method: Each test store is matched to multiple control stores where the Euclidean distance meets a threshold and each control store is weighted.

   b. Buyer Lift, when using observational measurement, leverages a statistical methodology called RIMM weighting to balance the composition of the test and control groups of households by using variables such as brand and category purchases, geography and demographics. For Randomized Control trial, the partner randomly creates a control group. Nielsen offers balancing reporting to clients to provide insights on the unbiased nature of the holdout sample.

B. Steps taken to ensure that control group members have not been exposed: For analyses that use HH data, we can look at media exposure (e.g. TV through our Nielsen TV panel, Digital through cookie tracking, etc.) to ensure that only the test households were the ones that have seen the ad campaign that's being tested.

C. Steps taken to ensure test and control groups are similar and representative of target population: Buyer Lift uses a statistical methodology called RIMM weighting to balance the composition of the test and control groups of households with variables such as brand and category purchases, geography and demographics. In randomized control trial, we ensure that the control group mirrors the test group on demographic and purchase variables.

How other factors that could affect the dependent variable are controlled

We use Analysis of Covariance to quantify the impact of external factors and control for their influence on the dependent variable (if there is any). For example, we assess factors such as regular prices, promoted prices, items selling, store size, retailer/banner, product selling time, etc.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases / Pre-campaign sales data: Pre-campaign sales/purchase data are considered for both store/HH matching purposes as well as to control for any pre-existing (pre-campaign) difference in store sales or HH purchases when evaluating the media campaign impact.

B. Halo effects of sister brands: We can measure the media effect on sister brands in order to provide a more comprehensive ROI/ROAS picture. When ordering a lift or Attribution study, a client has the ability to define items. This could be the targeted brand decomped into sub-brands (halo) and for Lift, category, rest of category, etc. All of these items help clients look at halo and competitive market effects.

How exposures across devices and channels are de-duplicated

For Nielsen Campaign Lift, we use online and offline data match partners to de-duplicate exposures across different devices and channels. We can provide measurement for A only, B only, or A union B.

How creative and media effects are distinguished

If a campaign has more than one creative, we can measure the impact of each creative by subsetting the exposed households and analyzing their response to each creative.

Other validation techniques used

Nielsen also uses Monte Carlo testing to validate model types and accuracy.

APPENDIX: DETAILED RESPONSES:

NINTH DECIMAL

Methodology used to measure lift/ROI/ROAS:

Multi-touch Attribution. Comparison of the visit rate of the exposed population and unexposed population to determine lift.

Sources and types of data on walled gardens

Currently, partnering with them to provide visitation data for campaigns on a case by case basis or on-going.

Steps typically taken to enable analysis to be projectible to the target population

We employ publisher/partner match rates and DMA coverage.

Control group

A. How it is selected: Can use hold-out control provided by partners or a forensic control matching methodology. Hold Out Control is a population provided by partners that was not exposed to media but mimics the exposure group. Forensic control matches exposed users to unexposed (control) based on a number of matching features.

B. Steps taken to ensure that control group members have not been exposed: The exposure is based on the specific campaign and DID and the control is selected from those not in the population that follow either the hold-out control or Ninth Decimal forensic matching.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Provide baseline visits and they are leveraged to calculate LCI.

How exposures across devices and channels are de-duplicated

Multi-touch attribution

How creative and media effects are distinguished

Creative is a component of the media exposure. In results analysis an advertiser can see results for media overall as well as by creative if the information has been provided.

APPENDIX: DETAILED RESPONSES:

SAMBA TV

Methodology used to measure lift/ROI/ROAS

Digital control groups are constructed by serving placebo ads to randomly selected HHs in the target audience. We find exposed HHs by detecting which HHs were exposed to a TV ad. We construct a Synthetic TV control groups via a proprietary method of finding unexposed HHs in the target audience who have the most similar TV viewing habits to the exposed group. Using these 2 control groups we can measure accurate lift numbers between the unexposed, control unexposed, and exposed groups, allowing us to calculate the propensity to convert as well as the actual lift from having been exposed to the ad.

Sources and types of data on walled gardens

We have relationships with walled-gardens to measure social engagements and resolve that against TV impressions through direct integrations. We also can place pixels or leverage an existing pixel from a website to resolve online engagements against TV impressions.

Steps typically taken to enable analysis to be projectible to the target population

Our Research Panel of 3M US TV HHs from 14 different TV OEMs is projected and normalized to US Census data by DMA, gender, age, ethnicity and income. The result is a weighted and balanced panel that differs from the current makeup of the entire US by less than 0.1% (and oftentimes ch smaller than that).

Control group

A. How it is selected: TV Control is generated via a proprietary synthetic control identification methodology described in the methodology section above. Digital is preferably created via campaign-based targeting segmentation for true experimental design. Both TV and digital control methodologies can be merged for cross platform measurement.

B. Steps taken to ensure that control group members have not been exposed: Samba is able to identify which households are control vs exposed and can actively segment within the measurement study by accessing our proprietary device graph for each household to ensure which, if any, exposure experiences were tracked during the measurement period.

C. Steps taken to ensure test and control groups are similar and representative of target population: Samba analyzes each group to ensure the behavioral, geographic, and demographic profiles are aligned between test and control groups. We calculate statistical differences and high-dimensional distance metrics between the exposed HHs and the HHs in our synthetic TV control group based on viewership habits, demographics, and geography, in addition to calculating the statistical precision of our synthetic TV control group.

How other factors that could affect the dependent variable are controlled

Via our comprehensive picture of viewership behavior, the model we use to build a synthetic control group incorporates a number of latent behavioral factors that impact campaign exposure and conversion. Examples include viewership delivery methods, channel surfing and skipping behavior, and density and length of viewership sessions.

How analysis accounts for . .

A. Diminishing returns: By analyzing the conversion behaviors of a group relative to other mutually exclusive groups based on exposure experience. For example, mutually exclusive exposure groups segmented by the exposures served to a device.

B. Baseline consumption, behavior, or purchases: By creating Digital and TV control groups to compare test vs control (baseline).

C. Pre-campaign sales data: If available, pre-campaign sales data for test and control groups are compared to during and/or post-campaign sales data to analyze shifts in behaviors not related to campaign exposure.

D. Halo effects of sister brands: If further brand portfolio sales data is available, can assess lift of other brand sales behaviors across test and control groups

E. Competitive activity: Treat similar to halo effects of sister brands, if data is available, analyze the changes in purchase behavior for competitive brands across the measurement groups in the study.

F. Interactions/synergies between media: Samba creates isolated exposure groups based on verified experience with each media channel. Each media channel can be assessed in isolated or in cross-combination exposure experiences where feasible.

How exposures across devices and channels are de-duplicated

Samba uses a proprietary device graph to deduplicate household reach and frequency across devices and channels.

How creative and media effects are distinguished

Samba analyzes lift from test and control groups at very granular levels to isolate whether media effects (plan, TV network, daypart, day of week, frequency levels, etc.) or creative are driving/not-driving lift. Samba has the ability to isolate to granular media levels and to analyze how creative mix and overall effectiveness are playing a role in incremental lift.

Other validation techniques used

We calculate statistical differences and high-dimensional distance metrics between our synthetic TV control groups (SCG) and the exposed groups based on viewership habits, demographics, and geography, in addition to calculating the statistical precision of our SCG.

APPENDIX: DETAILED RESPONSES:

TVSQUARED

Methodology used to measure lift/ROI/ROAS

TVSquared uses a 'test/control' methodology to isolate visits/responses that are driven by TV and measure TV lift. We create test and control groups from the impression data set based on exposed/unexposed households. When selecting the groups, we ensure that both are the same size and are strongly matched in terms of demographics and behaviors which allows us to accurately determine response that is TV-driven. Because we measure and track baseline website activity on a daily basis, we naturally take account of things like seasonality, one-off events and natural day-of-the-week patterns and so all of these daily patterns of behavior are reflected in our control group. We then apply various statistical analysis techniques to determine whether or not the results from the exposed group are statistically different from those of the control group and to isolate the true impact of TV.

TVSquared's unified approach encompasses two types of methodologies. This includes measuring performance (lift/ROI/ROAS) across a massive population and down to the household-level.

TVSquared uses a custom algorithm to determine which responses should be attributed back to TV by establishing a unique baseline for every advertiser. Different advertisers have different profiles and patterns unique to them; much like a fingerprint. All non-TV-related traffic is filtered out through a range of factors such as geography or visit type; like social or display ads. By measuring the number of website visitors every minute of every hour of every day, we're able to catalogue a clear understanding of regular traffic to an advertiser's website, and calculate the lift that can be attributed directly to TV. We also tie the TV-driven visits directly to specific actions, enabling advertisers to measure the KPIs (sales, registrations, app activity, etc.) that matter most.

For household-level performance, once we have mapped responses to our "exposed to TV" group and "unexposed" control group, we calculate the uplift in visits/response due to TV. First, we calculate the daily control group visits per spot, as well as the daily exposed group visits per spot. The difference between these two gives us the number of visits driven by TV for that individual spot.

Steps typically taken to enable analysis to be projectible to the target population

We do project household level data to the total population. We can apply a range of different approaches to do this depending on the available datasets in the specific TV market(s) we are measuring across. For example, our favored approach for extrapolating outcomes is traffic-pattern analysis. This uses correlation analysis to compare the overall pattern of web visits in the full response dataset with the pattern of visits in the

household-level impression data. The difference between the two is calculated on a daily basis and an upscaling factor generated which is then applied to upscale results to the total population. The advantages of this approach are that it analyzes a full (100%) response dataset rather than relying purely on panel-based assumptions, meaning any potential bias in the dataset can be identified and minimized, and by applying the upscaling factor at the spot-level it ensures a more balanced extrapolation with reduced bias.

Control group

A. How it is selected: TVSquared creates test-and-control groups from the exposed/unexposed household data provided by the selected impression data partner. Creating a control group is not as simple as just selecting a random group from the unexposed population. To ensure we can properly isolate the impact of TV, the exposed group and control group need to be as similar as possible. For example, similar demographic characteristics, TV viewing behavior and the opportunity to be exposed to a TV ad. If we can make sure that the exposed/control groups are strongly matched in this way, we can be confident that any difference in visit rate is being driven by TV. TVSquared's platform is data agnostic and has been architected on a 'BYOD' (Bring Your Own Data) principle. This means we can ingest data quickly and easily from multiple sources. As a result of this, we have a developed a growing ecosystem of data partners. For impression data this includes Inscape, assorted STB datasets and over 50 OTT partners, including all the major publishers, DSPs and SSPs. For demographics and identity, we work with partners such as Experian, LiveRamp and Adobe.

B. Steps taken to ensure that control group members have not been exposed: The households are all selected from a pool that have not been exposed to the advertiser's ads for 30 days prior to, and seven days following a spot being aired.

C. Steps taken to ensure test and control groups are similar and representative of target population: TVSquared creates a control group using stratified random sampling. This is a method that involves dividing the population of households within the data into smaller groups based on shared attributes. The control group is the same size as the exposed group and is strongly matched on demographics and behaviors, such as age, gender, household income, time since last visit, etc. Alternatively, holdout groups can be provided from the media services being used.

How other factors that could affect the dependent variable are controlled

When running regressive models to determine the longer-term impact of media on sales via Adstock and earned media effect, we control for category seasonality and external effects such as atypical behavior during holiday and national sales periods.

How analysis accounts for . .

A. Diminishing returns: TVSquared's frequency analysis incorporates diminishing returns, as we explore the impact of each subsequent exposure.

B. Baseline consumption, behavior, or purchases: Control group behavior informs the baseline.

C. Pre-campaign sales data: Our analysis does not rely on a pre/post methodology, but we take in continuous streams of data.

D. Adstock: For advanced TV, our closed-loop methodology means we don't need to rely on Adstock. Instead we can trace individual responses back to historical exposure. For linear, we generate an Adstock curve that captures the delayed response and its decay over time based on web response. A series of multivariate regression models are created, each with a different Adstock value injected into the data. The Adstock percentage shown is a percent value ranging from 0-90% that describes the calculated week-on-week carryover and decay effect.

E. Interactions/synergies between media: We are able to apply MTA (multi-touch attribution). First, our MTA model credits each impression based on recency against an algorithmically defined decay curve (based on the decay observed during the TV uplift analysis). Each impression is plotted on the curve based on its timestamp relative to the target outcome event (e.g. registration or sale). Then we apply a weighting based on statistical analysis across all similar impressions in the campaign.

How exposures across devices and channels are de-duplicated

Using one or more identity resolution technologies such as LiveRamp or Experian.

How creative and media effects are distinguished

Results are available by media and by creative. If the same creative has been used across a variety of channels/dayparts/weekdays insight can be extracted about both the media and the creative impact.

Other validation techniques used

Because we are in the fortunate position of running multiple models, we are able to use differential approaches to attribution and perform cross-validation with the outcomes of each. Additionally, throughout our processing of any sample or panel datasets, we use confidence scores to ensure that results are statistically significant.

APPENDIX: DETAILED RESPONSES:

UPWAVE (FORMERLY SURVATA)

Methodology used to measure lift/ROI/ROAS

Test and control methodology, propensity scoring for weighting:

Upwave uses a control vs. exposed methodology and is a solution based on a publisher network methodology rather than a panel. Publishers embed Upwave's Surveywall as an alternative to paywalls in front of long-form premium content and a consumer takes a short questionnaire to unlock that content.

We begin by studying the targeting of an upcoming campaign and suggesting behavioral questions that can be added to the survey. These questions aim to capture any important pre-existing population differences that could be correlated with ad exposure. Once the survey is completed, we mathematically determine the set of demographic and behavioral factors that are most associated with being exposed to an advertisement and use these factors to build a logistic regression model to estimate each survey respondent's probability of exposure.

We use this propensity model to group together exposed and control respondents with similar probabilities of exposure. Since these respondents have similar probabilities of exposure, each group is approximately a randomized controlled trial (RCT), allowing us to estimate lift by differencing. Averaging together these group-level lift estimates, we can produce an accurate estimate of the overall average lift that has minimal bias and low variance.

Sources and types of data on walled gardens

If the brand is targeting walled gardens using an audience segment, they can push that same segment to Upwave for sampling. Upwave will assume that an individual who was targeted for walled garden exposure, was reached. Upwave will identify the audience when it reaches a site on Survata's digital network, include them in the exposed group, and invite them to take the survey. *NOTE: THIS METHODOLOGY WILL NO LONGER BE POSSIBLE WITH DEATH OF IDFA/3rd PARTY COOKIE.

Control group

A. How it is selected: Unexposed to the campaign, matched to the exposed group on demographic/behavioral variables. Exposure is measured via event tag; Control is eligible by not being exposed to the campaign, and then selected by a "twinning" criteria, matching the exposed group on

i. Age
ii. Gender
iii. Operating System
iv. Geo location
v. HH Income
vi. Same site on digital network as exposed respondent

Age and gender are collected via the first two questions of the survey, and all other data is from the http information on the interview wall.

B. Steps taken to ensure that control group members have not been exposed: Control group contamination is minimized with the household level cross-device. Despite the loss of device identifiers, Upwave will continue to deterministically measure individual-level brand lift with no loss in coverage. Upwave's HH Intercept methodology minimizes control contamination that happens as a result of cross-device exposure:

a. Step 1: Upwave Captures Exposure Signals
   i. Upwave Tag records the IP address, and device data (OS, browser)
   ii. Only residential IPs are considered, and are associated with HH size (from the survey)
b. Step 2: Every Household is Assigned to Exposed or Control. Data collected and brand lift calculated.
c. Step 3: Household Lift Rescaled to Individual Lift based on Exposure Signals

C. Steps taken to ensure test and control groups are similar and representative of target population: Ensure our digital network is US Census representative. Match 1 to 1 exposed vs. control.

How other factors that could affect the dependent variable are controlled:

Propensity to either be exposed to other media or have pre-existing attitudes towards the brand via behavioral survey answers. Plus modeling.

Specific methods used to perform our weighting procedure:

1. Control Collection Methodology - Selecting control respondents to minimize discrepancy
2. Propensity Score Estimation - Building a model for the probability of exposure
3. Trimming and Stratification - Grouping respondents with similar propensity scores
4. Lift Estimation - Estimating mean lift by averaging over group-level lift estimates

Upwave weights the control and exposed audiences on demographic, technographic, and behavioral confounders:

1) Demographic - age, gender

2) Category Usage - behavioral question

3) Brand Usage - behavioral question

4) Media consumption; Heavy/light/medium - behavioral question

5) Channel usage - behavioral question

6) Site visitation - publisher level control

7) Technography - environment (web/app), operating system, device type, region

8) Response - days since respondent exposure to complete

Survata collects exposed sample before collecting control, to ensure that the control sample most closely matches the exposed sample.

Our data is cleansed and weighted on a predetermined cadence with each client; every time data is cleansed, our data science team reviews the weighting methodology and makes adjustments depending on variance in sample from cleanse to cleanse. This data is available via API to import into BI tools or available as flat files, etc.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: self reported, control group

B. Halo effects of sister brands: self reported, control group; see “Other factors” above

C. Interactions/synergies between media: measured with tags, control group; see “Other factors” above.

How creative and media effects are distinguished

We do counterfactual analysis to isolate the incremental impact of media vs. creative tactics.

APPENDIX: DETAILED RESPONSES:

VEEVA (VEEVA CROSSIX)

Methodology used to measure lift/ROI/ROAS:

Crossix uses A/B testing, always with a matched control group, to understand lift. ROI is calculated based on the patient value (provided by the client) and the media cost.

Sources and types of data on walled gardens

Crossix uses varied approaches depending on the partner.

Steps typically taken to enable analysis to be projectible to the target population

Crossix uses the industry's leading connected data set, to provide a high degree of patient health data coverage.

Control group

A. How it is selected: For direct-to-consumer (DTC) campaigns, control groups are selected based on hold-out groups or a proprietary control selection that includes similar health and demographic attributes, as well as other information. For health care professional (HCP) campaigns, control groups are selected based on hold-out groups or a proprietary control selection that includes HCP prescribing behavior, as well as other information.

B. Steps taken to ensure that control group members have not been exposed: Crossix uses media exposure data to ensure that the control group has not been exposed. For cross channel analytics, Crossix accounts for all actual exposures.

C. Steps taken to ensure test and control groups are similar and representative of target population: Crossix has a proprietary approach that precisely matches vectors of patient health histories on the relevant variables to ensure that the test and control groups are representative of the target populations.

How analysis accounts for . .

A. Baseline consumption, behavior, or purchases: Crossix leverages robust health information, including Rx, claims, labs, hospital and other data to understand patient health history.

B. Pre-campaign sales data: Crossix leverages robust health information, including Rx, claims, labs, hospital and other data to understand patient health history.

C. Interactions/synergies between media: Crossix leverages media exposure data to understand the overlaps and frequency of exposure to each channel. We untangle the effects of the overlaps through attribution. We measure the comparative efficiency of individual channel and cross channel exposure to attribute benefit in proportion to the efficiency of media in driving conversion.

How exposures across devices and channels are de-duplicated

All exposure information is matched to an actual user and/or household. For exposure across channels, we want to understand where and how much users were exposed to each channel and attribute appropriately.

LEARN MORE

For questions about the paper or a consultation on its topics, contact us. If you're interested in contributing to similar research projects in the future, enroll in the ARF Cross-Measurement Council.

ABOUT THE ARF

Since 1936, the Advertising Research Foundation has been the standard-bearer for unbiased quality in research on advertising, media and marketing. Its powerful knowledge, unifying standards and best practices have benefited its 400+ member companies many times over. Only the ARF brings together advertisers, agencies, media companies, research companies and ad tech into one conversation about how to be better at what we do.

ABOUT THE ARF CROSS-MEASUREMENT COUNCIL

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