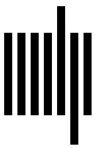
Selling the American People

Advertising, Optimization, and the Origins of Adtech

By: Lee McGuigan

Citation:

Selling the American People: Advertising, Optimization, and the Origins of Adtech
By: Lee McGuigan
DOI: 10.7551/mitpress/13562.001.0001
ISBN (electronic): 9780262374248
Publisher: The MIT Press
Published: 2023



The MIT Press

8 VIVE LE ROI! ACCOUNTABILITY AND THE PULLING POWER OF ATTRIBUTION

> The problem of measuring advertising's ultimate effectiveness is as old as advertising itself. One hopeful step toward a solution has recently been taken by companies employing certain mathematical and analytic techniques loosely defined as operations research.
>
> —*Minutes of the First Meeting of the Operations Research Discussion Group*

Looking at the impact of management science on marketing up to the mid-1950s, a professor at the Carnegie Institute of Technology lamented a considerable lag in comparison to its impact on production. Melvin Anshen said the factory setting lent itself to observation and control, and applying "the science of cost accounting" in manufacturing generated valuable information that "was a further incentive for rationalizing management." The situation in marketing was messier: relationships between variables were harder to isolate from confounding factors, and some of the most important variables and interactions were nearly impossible to measure or manipulate. Except for direct marketers and some grocery and drug makers that subscribed to sales tracking services, "manufacturers do not know how to establish direct cause-effect relationships between sales promotion outlays and sales to ultimate consumers." They were left to rely on "measures of indirect relationships," such as evidence of advertising exposure, or to draw conclusions from "the raw information on what was spent and what was sold, with such a gossamer bridge between the two as the interested parties may be willing to construct." That hardly seemed like a sturdy bridge to the future. The mounting

weight of marketing costs compounded pressures to exploit the "outstanding potential contributions" of optimization techniques such as linear programming. Crucially, though, Anshen observed a major impediment: "One dominant influence in the marketing process—the consumer—is outside of management's direct control and is only partially, and until now usually unpredictably, susceptible to manipulation and influence."[1]

Operations research excelled at orchestrating factors of production and distribution that responded faithfully to directives and immutable laws. But people existing outside an organization's scope of command did not always conform to management's plans. The whole project of using operations research and management science (OR/MS) to optimize advertising implied ambitious designs to account for consumers' economic value and their expected and confirmed behaviors. Management science machines demanded and enacted calculable consumers whose attributes, activities, relations, and probable futures could be materialized as data and represented numerically in models. Rendered in these ways, by drawing on practices such as cost accounting,[2] complex marketplace actors would apparently become more legible and manageable. According to Sigfried Giedion, efforts within scientific management to precisely measure industrial motion were aimed at "giving a full account" of workers' movements.[3] OR/MS promised progress toward a related aspiration: to precisely measure consumers' movements and give a full account of advertising productivity.

Advertising's calculative evolution is defined in part by the expansion of models and measurement capabilities to accommodate more consumer behaviors. Marketers have essentially tried to extend managerial observation and control over the sphere of consumption. The goal is to account for the outcomes of advertising investments and the value of advertising opportunities, where accounting means not only recording and enumerating but also admitting those quantities into the frame of rational planning and action. "By enhancing the inventory of relations and events to be taken into account," Michel Callon explains, "marketing tools promote calculations which constantly involve more and more elements and relations."[4] Advertisers have dreamed of not simply paying to put messages in front of potential consumers but rather reorienting buying procedures around the verifiable results of their investments. To put it more formally, advertisers want the objective functions in their optimization models to directly represent consumer purchases or company profits, rather than proxy measures

such as audience ratings or shoppers' attitudes toward a brand. "If media planning is ever to be put on a more scientific footing," a 1964 report by the Advertising Research Foundation (ARF) urged, "additional ways must be found to fasten the connection between media and ultimate sales."[5] Advertisers enlisted operations researchers for exactly this mission—to reinforce the "gossamer bridge" between advertising and its measurable results.

TAKING AND GIVING ACCOUNTS

OR/MS established its place in the marketing field by turning the determination of advertising effectiveness into a matter of disciplinary concern and consulting expertise. The process of making claims about "the 'chain of causation' from selling stimulus to buying response," as one statistician put it in 1957, is what the industry now calls "attribution."[6] It is an approach to calculating return on investment (ROI) whereby specific marketing actions are credited for their discernible contributions to marketing outcomes. The will to attribute sales to particular advertising decisions and events has channeled energies toward the present state of the art, where advertisers and adtech intermediaries build campaigns and transactions around specified behavioral outcomes. Attribution is the crowning achievement of OR's original promise to optimize ROI. And it has been a siren song for consumer surveillance and datafication initiatives.

This chapter examines the persistent desire to measure consumer behaviors in response to advertising and to incorporate those measures into advertising's exchange relations and evaluative metrics. It is about *accountability* in a literal sense—the ability to take things into account. Advertising accountability has two interrelated vectors. One is to account for advertising effects in terms of ROI. The other is to account more precisely for the expected value of consumer populations, audience targets, or even an individual's momentary propensities. Both vectors depend on capacities to generate data, to process and analyze those data, to assemble new claims (about advertising effects, or how to classify and value a profiled consumer), and to legitimize those claims within interorganizational action. Accountability, therefore, is also rhetorical.[7] By documenting consumer behaviors and advertising effects more carefully, marketing professionals can ostensibly give more convincing accounts—producing evidence of optimal decisions made rationally.

One of the most forceful arguments promoting digital advertising is that it takes advantage of the record-keeping and identification capacities of internet servers, networked databases, analytics software, and tracking tools like cookies and pixels. Advertisers invest in digital media because they are more accountable—they datafy more behaviors and relations. This has been conventional wisdom for two decades. But the arguments and operations we associate with digital adtech capitalize on the particular historical development of accountability as an affordance. The envisioned potential to better account for the value of consumers and advertising investments has been constructed over half a century and attached repeatedly to new information technologies. Computer systems and mathematical models provided a powerful set of scientific, technological, and discursive resources for defining and venerating accountability in marketing. More than just recording reality, these means of accounting enacted realities in particular, strategic ways.

Apostles of management technique confronted advertisers' attribution anxiety—their long-standing fear that some unknown portion of ad spending is wasted—by suggesting that technoscientific breakthroughs were making it possible and, indeed, imperative to account for ROI. Computerization and OR/MS necessitated more consumer data and increasingly frequent and intensive forms of market analysis. Marketing's emergent class of mathematical elites tried to harness new technologies to their vision of a world where more spaces and devices would be instrumented to collect behavioral measurements and where those measurement instruments would be integrated into adaptive management and decision support systems. Perhaps as much as the desire for better targeting, the dream of determining advertising effectiveness has motivated marketing professionals to position themselves where they could witness more scenes from consumers' lives.

An expansive vantage point is essential for attribution. Isolating the unique effects of specific advertising events requires both close observation of the causal chain between exposure and eventual marketplace action and a careful accounting of the many other factors that can influence the relationship between advertising and sales. In other words, a credible attribution claim depends on evidence that an ad was served, seen, and acted on, as well as evidence that helps rule out alternative explanations. Not surprisingly, then, attribution is a pesky knot to untangle.[8] Researchers funded by the Leo Burnett agency began an article in *Applied Economics* by admitting, "Analysis of the influence of advertising on sales is a difficult and dangerous

undertaking."[9] Some researchers concluded that it was hopeless. "Over the past generation," Leo Bogart huffed in 1966, "the research world has been strewn with the bleached skeletons of innumerable unsuccessful attempts to measure accurately the specific effects of a specific advertising campaign."[10] Importantly, though, the dream never succumbed to frustration. Quite the opposite. Failure to find conclusive evidence of advertising effects only motivated efforts to look harder—and to hire more skilled technicians. Frank M. Bass, one of the researchers funded by Leo Burnett, reaffirmed his commitment a decade later when Stanford University hosted the first OR/MS conference on marketing measurement and analysis: "Despite the difficulty and dangers of formal analysis of the effects of advertising and promotion upon sales, the profit potential from the application of modern statistical methods and management science systems is very great."[11]

For the advertising industry, accountability is perhaps the most seductive affordance that can be attached to new technologies. Its appeal is woven into the logic of selling the American people. Faith in the power of advertising has been a fixture of US corporate culture. As a game theorist working for M&M Candies put it in 1959, "every executive knows that advertising has an effect on the sale of his products despite the fact that he may not be able to measure this effect quantitatively."[12] This performative belief in advertising effects is existential. The whole massive advertising industry presupposes that advertising works, and thus a large professional community is committed to the idea that advertising produces sales and influences behavior. Vast assemblages have been built around the desire to account for these relationships, which are fiercely assumed to exist but nearly impossible to confirm.

The difficulty of determining advertising effects has helped justify strenuous efforts to monitor and identify consumers, to amass analytical power for parsing interrelated variables, and to leverage precise forms of discrimination and targeting. As observers have acknowledged for decades, uncertainty about whether advertising works has left marketers vulnerable to commercial research and data providers that promise to bridge this knowledge gap, often with answers that are pleasing but hard to adjudicate. To put it bluntly, the causal effects of advertising may be practically unknowable, but since that unknowability cannot be openly tolerated, the challenge of sifting through the mess of reality to mine evidence of attribution is an important source of motivation and power. It gives a strong and persistent warrant for investing in datafication, analysis, and technical expertise, and

it supports today's gargantuan markets in surveillance, data, and analytics. One of the strongest competitive claims made by walled gardens such as Google, Meta, and Amazon is that they know, better than anyone else, what advertisers are getting for their money and that they can tune their management science machines to optimize ROI. The commitment to determining advertising effects has itself had profound effects.

CASH REGISTERS AND BALANCE SHEETS

It would be hard to overstate the fixation on ROI in certain parts of the advertising business. At a 1965 seminar for media buyers and sellers, the director of marketing at the Doyle Dane Bernbach agency emphasized this point by redefining the nature of the "client" being served in advertising. "It's neither a product nor an advertising manager nor a company president. *The client is invested capital*. The capital is invested to make a profit and that is exactly the name of our game. It is the function of our advertising to produce profit for the corporation." Calculating the effect that a change in ad spending would have on profit, he said, was among "the greatest open questions in our business today."[13] A business professor later wrote in *Management Science* that the relationship between advertising and sales was probably "the most researched area in marketing."[14]

The roots of this outlook run throughout the modern history of US advertising. Ever since advertising became understood as a mediated form of salesmanship, Daniel Pope explains, "advertising people of all stylistic bents have agreed upon the purpose of the work: the task of advertising is to sell. The only legitimate measure of success is at the cash register." This "credo" not only unites management and creative production around a common objective; "it is a fundamental element of continuity in advertising from the beginning of the [twentieth] century until today."[15] This is the culminating logic on one side of selling the American people—where advertising tries to accelerate the circulation of commodities. But on the other side—where media companies package and sell evidence of audience attention—the business has been organized around practical compromises.

Attention, audiences, and ratings are all proximate constructions of the influence advertisers are trying to buy. Dissatisfaction with exposure-based audience measurement endured throughout the broadcast era. Agitation for more behavioral or cognitive means of evaluating advertising opportunities

came both from advertisers and sometimes from broadcasters that wanted to tell a better story about what they were selling than ratings permitted. Responding to publicity about a new approach for measuring radio and TV audiences in the late 1940s, the executive vice president of a Massachusetts station wrote, "I don't think that any radio research technique can be termed revolutionary until a method is developed which will determine and disclose the impact of radio on the mind of the listener. . . . The success of a program can be known only by its effect upon its hearers, whether its purpose is to entertain, to sell merchandise or both."[16] Thirty-five years later the former director of marketing research for Lever Brothers reiterated that ratings data were merely "*the surrogate for what advertisers want to have but do not yet have*." After all, he said, it is "the function of media planning to optimize the effectiveness of the media, not only in terms of reach and frequency but more importantly in terms of response."[17]

Advertisers wanted audience measurement to get close enough to consumers to hear the cash register ring. But it was easier and cheaper to produce evidence of advertising exposure than evidence of its effects. And exposure, though still contested, was a simpler construct to standardize for pricing and exchanging commodity audiences. To the extent that advertising effectiveness could be brought into the picture, most of the early social-science research tried to measure the impact of advertising messages on consumer attitudes or memory, rather than to attribute purchasing behaviors to those ads. A large field of mostly psychological research looked for evidence that audiences recalled and retained commercial communications. These were some of the questions that gave rise to an industry in opinion polling and the social construction of a mass public.[18]

Operations researchers, and the agency departments they worked with, demanded information about audiences that was both detailed and standardized—data suitable for modeling and computation. Bogart wrote that OR's "huge appetite for data" helped create "a whole new priestly caste: the syndicated media researchers."[19] But operations researchers were seldom satisfied with the exposure-based ratings sold by Nielsen and others. Furthermore, they were not especially interested in whether and how people absorbed advertising messages. "Nobody will argue seriously that the ultimate goal of advertising is to communicate rather than to increase sales or the profits of the company," explained Michael Halbert, an OR specialist in DuPont's Advertising Research Department. "You might move to

a communication measure because you would like to measure sales but you can't."[20] Companies tried to optimize communication objectives, Halbert said, because management could easily control and observe the relationship between an independent variable like ad spending and an outcome variable like exposure. By contrast, the sales response to advertising is a function of many interacting and possibly unobservable factors. "If you use sales as the measure of effectiveness, you have additional variables you don't have if you use impressions or attitude change or favorableness toward the product, etc. . . . It's easier to build a model if your measure of effectiveness is change in attitude or information: on the other hand, as is always true, it's less useful."[21] MIT professor Ronald A. Howard stated the matter frankly at a 1962 meeting: "*intention* to buy doesn't go on the balance sheet, only the sales."[22]

Operations researchers were invited into advertising with a mandate to apply their unique skill set to exactly this problem. A professor at Princeton University observed that businesses were increasingly turning to "economists and statisticians for analytic advice concerning the effectiveness of their advertising effort." This pattern seemed to him "a natural accompaniment of the noted successes achieved by operations researchers in other business problems."[23] Already by the 1940s, one mathematical astronomer was using what he would later describe as OR to measure the "pulling power" of department store ads, or "*the amount of sales produced per dollar of expenditure*."[24] These techniques flowed into a current of work aiming to refashion marketing as a more quantitative science. "The principal hope for developing more rational promotional plans," wrote Joel Dean of Columbia University, "lies in improved methods of measuring the effects of advertising." He acknowledged, however, that "relating outlays to the sales they produce is a formidable problem and calls for elaborate statistical attacks."[25] Pollster Sidney Hollander Jr. thought these statistical attacks would allow marketers to treat advertising as a measurable investment, rather than setting budgets arbitrarily or as a percentage of past sales. He hoped tools such as "graphic multiple correlation" and "factor analysis" would enable "the rationalization of the advertising appropriation to achieve the greatest net return for each dollar of expenditure."[26] He admitted, however, that the data needed to perform these calculations were lacking, so he advocated for the refinement and extension of market research.

There was widespread agreement on that point. Outlining the future for "behavioral management science," Samuel P. Hayes Jr. emphasized in 1955

that a "science of consumer relations management" would require intensive observation and analysis of consumer activity. Hayes, who had previously worked as a researcher at Young & Rubicam and Dun & Bradstreet, wrote, "Much more will be known tomorrow than is known today about consumer motivation, buying habits, and susceptibility to particular advertising media and themes; but, they will by no means obviate the necessity . . . of continuous collection and evaluation of data."[27]

Advancing a science of consumer relations management was thus seen as a problem of observation and classification. If attribution was to be more than a gossamer bridge between gross expenditures and total sales, then buying behavior needed to be documented and assessed more carefully—marketers needed to take more exact measurements of consumers and their value to the firm. A canonical essay on market segmentation noted that the strategy depended on "the maintenance of a flow of market information" and "the full utilization of available techniques of cost accounting and cost analysis."[28] Management scientists encouraged advertisers to use cost accounting to identify which consumers, markets, and sales were actually profitable and which were a drain on marketing expenditure.[29] As early as the 1930s, marketing theorists had "advocated that promotion costs be allocated to individual customers on the basis of the amount of gross profits obtained from them."[30] Charles H. Sevin of the US Department of Commerce suggested that better accounting of marketing costs would fuel "a definite acceleration of the tendency toward selective distribution. Instead of merely striving for an ever increasing sales volume regardless of its profitability, the aim of marketing will shift toward 'selling the right products, in the right quantities to the right people in the right locations.'"[31] Writing with William Baumol in 1958, Sevin suggested pairing "distribution cost analysis" with mathematical programming. By calculating the "best" option for allocating marketing investment using "the standard optimization technique, i.e., differential calculus," the "businessman" could make marketing decisions that were "virtually guaranteed to increase his profits."[32]

"FORMULA'D" FIGURING

By this time, advertisers and their agencies were working with operations researchers to put these techniques into action—examining advertising effectiveness and trying to formulate mathematical decision rules for setting

advertising budgets and allocating expenditures.[33] They experimented with ad spending in different regions or at different times and then tried to discern the sales effects attributable to advertising.[34] General Electric began applying OR to the problem of measuring ROI in 1957. As a researcher there explained, "Applications of computers to the problem brought new hope. These electronic marvels make it possible to analyze masses of data in multiple combinations to see what relationships exist between the dollars spent on advertising and the dollars returned in sales. Businesses everywhere are 'playing with the figures' hoping a formula'd answer will be forthcoming. 'Spend "X" dollars on advertising and expect "Y" dollars in sales.' That's the hoped for equation."[35] Y&R described its work in this area as an effort to develop a "measure of the productivity of advertising."[36] Y&R's Kenneth Longman explained that "so many factors other than advertising play such a considerable part in producing sales that attempts to attribute sales changes to advertising can be hopelessly misleading."[37] With help from Wharton professor Wroe Alderson, Y&R researchers tried to break the impasse with brute-force statistics: "an elaborate sifting of all the possible influences upon sales." They produced answers and recommendations for the client, but the effort was not a resounding success.[38]

DuPont took this concept further than perhaps any other advertiser at the time. The petrochemical giant stands out as an early leader in using OR to study advertising and in orienting corporate planning around ROI.[39] DuPont's Advertising Research Department housed a staff of operations researchers that included Michael Halbert, the founding chair of the ARF's OR discussion group, and Malcolm McNiven, who later held senior management positions at Coca-Cola and Bank of America. These researchers tried to determine advertising effectiveness with iterative model building and experimentation: "this method involves first constructing mathematical models of how sales are achieved in the market, then making ad budget adjustments in test markets, using the results of the test to refine the model, testing again, and so on. With each step, the model should more accurately explain the effect of advertising and other factors on sales."[40] This model, once refined, would be used to "predict the future effects of changes in advertising." But despite the pricey computer equipment, DuPont's predictive power remained weak, a shortcoming attributed to "the practical difficulties in the way of feeding the oracle enough data."[41] Still, the possibility of discerning how changes in advertising policy impacted profits held enormous appeal.

Even a minor improvement in efficiency could mean substantial profits for a company spending $30 million on advertising to consumers and industrial customers in 1958.[42] DuPont later hired Simulmatics to continue this work,[43] and by 1963 the firm was budgeting $700,000 to study the effectiveness of its advertising.[44] DuPont's manager of advertising research told a meeting of the Association of National Advertisers in 1966 that the company believed these inquiries "should be capable of determining the contribution advertising makes to profits."[45] He also mentioned the company's progress on building predictive models.[46] An article published the following year reported that DuPont was able "to predict the sales response to a new advertising campaign within a few percentage points of the actual results."[47]

DuPont was one of a handful of corporations investing in the production of evidence—and evidential technique—of advertising effectiveness. These initiatives sent ripples beyond any single company. In addition to fueling evangelism for a more quantitative and scientific attitude in management cultures, OR/MS projects helped furnish new marketing databases. Advertisers' demands for rational media services spurred agencies to build "tremendously valuable" libraries of information.[48] In a 1956 memo about the recent restructuring of J. Walter Thompson's media operations, the agency described the mass of information accumulated in the service of some exacting clients: "The voluminous number of documents and charts that have been produced is a little staggering. . . . While we seem to have statistics running out of our ears for Ford, Scott [Paper], etc., this information has already had tremendous value in approaching media planning for all Thompson clients."[49]

An enthusiasm for mining insights from these information assets anticipated the now characteristic imperative to accumulate and hoard data in case something valuable might be discovered later. Wroe Alderson, director of the Management Science Center at the University of Pennsylvania, noted this impulse in 1963: "the constant pressure for better forecasts may occasion a deep regret for past [business] records thrown away. It is impossible to foresee all the possible uses of information which appears relatively useless today."[50] MIT's John D. C. Little also encouraged extensive data collection: "One of the great virtues, in my opinion, of getting into a program of continuous experimentation is that it imbeds in your past history excellent possibilities for analysis."[51] Furthermore, his enthusiasm for staging experiments to strategically datafy reality presaged the engineering disposition built into algorithmic adtech platforms: "Why not arrange things, if

you are the president of the company, so that the world is easy to analyze instead of sitting back passively and letting the world go its own complicated way? Why not take your power of intervention and use it to maximize your own information state?"[52] This is a reasonable description of how Google and Amazon assert platform power in advertising today.

By the 1960s, "electronic computers had made vast stores of information available" to advertising managers.[53] These growing databases, and the statistical methods of extracting practical knowledge from them, enabled novel ways of sorting consumers according to their potential value. When Stanford University professor William Massy analyzed a data set of household purchases provided by JWT and the Market Research Corporation of America, he found that socioeconomic and personality variables were not helpful in predicting certain purchasing behaviors, such as brand and store loyalty. However, he saw promise in segmenting consumers into groups based on "promotional elasticities," meaning how sensitive their buying behavior was to advertising or price discounts. "I am convinced," he said, "that it's the dynamic response that is important for market segmentation."[54] Massy and other operations researchers wanted to use cost accounting and related methods to discriminate among different consumer populations—to recognize their "long-term value" and to distinguish them based on past purchases and "susceptibility to persuasion."[55] In other words, they were interested in classifying people based on their observed or inferred responses to manipulatable stimuli, rather than demographics. Their excitement was stirred more by emergent possibilities than the actual state of the art and the data, but wishful thinking out loud was itself a form of advocacy for new modes of accountability in marketing and media.

A WAVE OF ACCOUNTABILITY

Reflecting on advertising trends over the previous two decades, an editor at *Management Science* wrote in 1969, "There seems to be great advantage for media which can provide data on the audiences they reach." He speculated that this was related to the introduction of mathematical models for media planning. "Certainly models will tend to reward media with data," he explained, praising the fast-growing business of direct-mail advertising for its "extremely detailed" audience data.[56] This was a familiar observation. Direct marketing was generally perceived as more amenable to management

science than was brand-image advertising. A business professor pointed out in 1957 that the use of research to gauge advertising effectiveness was much more successful when consumer responses were rapid and "readily *traceable*": "*The easier it is to trace response to marketing actions, the easier the problem for research.*"[57] Direct marketing gave managers the feedback they needed. As economist Julian Simon put it in 1970, "Mail order advertisers have an almost perfect measure of the effect of their advertising."[58]

Agencies promoted direct mail by highlighting its accountability. JWT positioned itself in the late 1950s as having "pioneered the development of two particular areas of the overall advertising activity—specialized selling, and the creation of measurable consumer action." In a pitch to Nationwide Insurance, a direct-mail specialist at JWT said mailings that solicited immediate returns "can be likened to a brokerage operation: for the investment of X dollars, the advertiser creates Y dollars worth of business, at a profit of Z dollars within a stipulated period of time."[59] He was promising a "formula'd" equation for advertising investment. Very soon, a high-profile movement gave these metrics and mind-sets a home at the top of agency management. For its champions, accountability was part and parcel of information technology.

In 1960 Marion Harper Jr., the head of McCann-Erickson, formed the Interpublic Group of Companies (IPG), integrating multiple marketing services within a conglomerate holding company. Harper proselytized accountability as a central value for advertising and marketing. "The whole idea of accountability is the wave of the future—even a wave of the present," he said in 1961. "It will now be possible, with the help of social sciences and mathematics, to measure advertising as a single influence, isolated from all the many variables involved in carrying on a business."[60] Harper even suggested linking agency compensation to sales outcomes, a possibility enabled by the growing availability of information.[61] He assigned researchers and information systems managers an important role in his vision of marketing administration. IPG convened an Applied Science Division, which, according to its manager from the mid-1960s, "brought together media researchers and operations researchers to create systems to improve the effectiveness of media decisions for the clients of all Interpublic agencies."[62] According to a 1967 profile of Harper, "His success with clients is grounded in the belief that advertisers seek above all else an assurance that their advertising dollars are being spent wisely. Therefore, the Interpublic organization places

a great deal of emphasis on scientific approaches to advertising problem solving."[63]

Harper was ahead of his time in many respects. Agency holding companies later became the dominant pattern of industrial organization in advertising.[64] Throughout the 1980s and 1990s, the next generation of empire builders, such as WPP's Martin Sorrell, exploited the growth of "below-the-line" agencies that specialized in direct marketing. These firms were proficient in economizing and accounting for results. Importantly, "the below-the-line agencies were inevitably wedded to consumer and customer data, and technological and social developments were going to assure that data became more plentiful and powerful."[65] Harper agitated the industry to capitalize on information technoscience, and the diffusion of his conglomerate strategy intensified advertising's culture of accounting when mergers and acquisitions thrust agencies into the maelstrom of financialization, debt, and commitments to shareholder value.

Harper's plea to make agency compensation dependent on advertising effects also arrived too soon, running up against the existing commission system. Agencies earned almost all their revenue from what amounted to a refund by media companies—15 percent of the cost of the media inventory an advertiser bought stayed with its agency. This practice eventually fell out of favor, partly due to the interest in measuring advertising effectiveness. The commission system put agencies in an uncomfortable position with respect to advertisers' designs for setting optimal budgets. OR/MS investigations could, and sometimes did, conclude that advertisers were spending more money than they should.[66] Not surprisingly, agencies resisted recommendations to reduce ad spending, since that cut directly into their commissions. To resolve the conflict, some advertisers made new arrangements to incentivize efficient buying, rewarding their agency if spending decreased but sales did not. Anheuser-Busch negotiated such a deal in the late 1960s, under the guidance of Ivy League management scientists.[67] Other consultants with OR/MS experience, including a former head of media and marketing research at McCann-Erickson, accelerated the restructuring of agency compensation in the 1970s.[68]

Though he was ahead of the curve, Harper was not alone in his conviction that social scientists and mathematicians could use information technologies to tether advertising to sales outcomes. Many agency executives saw accountability as not only an affordance of management technique

but also an imperative. In 1963 a vice president at Y&R said computers and optimization models "force us to be much more scientific about ways in which we invest our clients' advertising dollars."[69] A year earlier, the president of the MacManus, John & Adams agency told the Association of National Advertisers, "All of us in advertising are going to have to justify and measure our efforts far better than we have been doing. . . . The value-return of every dollar we spend must be justified as best we are able—and with all the scientific assistance we can command—against the supreme criteria of today's industrial dollar."[70]

Increased emphasis on marketing among major corporations, and agencies' efforts to provide comprehensive marketing services, brought advertising, media buying, and market research into tighter integration with industrial operations. Agencies found that in dealing with clients, "top management is paying more and more attention to the advertising function. The result is a growing demand for a more efficient and higher professional approach to every facet of the advertising and marketing process."[71] Economic conditions accentuated these pressures. Pointing to a "profit squeeze" in US business in the 1960s, the president of Booz, Allen & Hamilton warned agencies that advertising spending would decline in proportion to sales. They could expect to feel the pinch as clients demanded more careful justification of plans, more convincing evidence of results, and, overall, "a far more rigorous and quizzical management environment than in the past."[72] Not letting a crisis go to waste, Y&R put an optimistic spin on the situation. In a 1961 ad in the *Wall Street Journal*, the agency welcomed this profit squeeze, which demanded a "cold and calculating eye" and put greater emphasis on research and planning, thereby delivering "a better return on advertising investment."[73] That became precisely the point of agencies' technocratic pitch in the years of intensive computerization that followed.

SHIFTING THE OBJECTIVE FUNCTION

The thrust toward management technique at advertising agencies was largely about reorienting decision-making processes around marketing objectives. Media selection, in particular, was to be judged against metrics that cut closer to companies' profit goals. As a vice president of media at the Cunningham & Walsh agency explained in October 1961, "Media and marketing are synonymous. An advertising medium is a market place, a distribution method.

And with more scientific data to be available more quickly in the future, with statistical relationships determinable by the push of a button, there will result a hastening of the marketing maturity which mediamen should achieve."[74] Less than a month later, BBDO debuted "its 'major breakthrough' in scientific selection of media via computers."[75] By using linear programming to optimize a formally stated objective function, the agency made the integration of media and marketing into an explicit design choice. This apparent breakthrough provoked the industry to openly discuss the purpose of media selection and to materialize commitments to accountability.

BBDO promoted its innovation with Madison Avenue's signature force. The agency took out a full-page ad in the *Wall Street Journal* to boast that it was making more efficient, and sometimes unintuitive, choices by computer-analyzing a "gigantic bank of facts" (figure 8.1). The ad drove home its message in massive font: "Linear Programing showed one BBDO client how to get $1.67 worth of effective advertising for every dollar in his budget."[76] The agency promised to improve ROI by more precisely distinguishing valuable audiences and advertising placements from less desirable ones. By assigning weights or values to different consumer groups, BBDO claimed it could maximize the delivery of not just prospective customers "but specifically prospects most likely to purchase."[77]

Some observers were not satisfied that optimizing advertising exposure among even the most desirable audience segments actually approached the objectives marketers truly cared about. At a demonstration of BBDO's linear programming model, a researcher from Price Waterhouse complained, "This discussion has not once touched on the effect of advertising on sales or profits."[78] A management scientist from Benton & Bowles made a similar observation: "If you don't have some criterion of return, either in terms of profit or sales, then you are maximizing something which is a function of a series of subjective judgments."[79] Critics alleged that BBDO's technique provided cover for a "circular game" whereby media planners could adjust the weights assigned to customer groups and media vehicles until the computer system produced the same selections as conventional methods.[80] But proponents defended BBDO's method as a step toward optimizing marketplace outcomes. The director of applied sciences at CEIR, a data processing firm that helped BBDO build its computer model, explained, "While our criterion (or objective) function is related to [advertising] exposures, it is modified in such a way that it is probably related to advertising effect on the desired

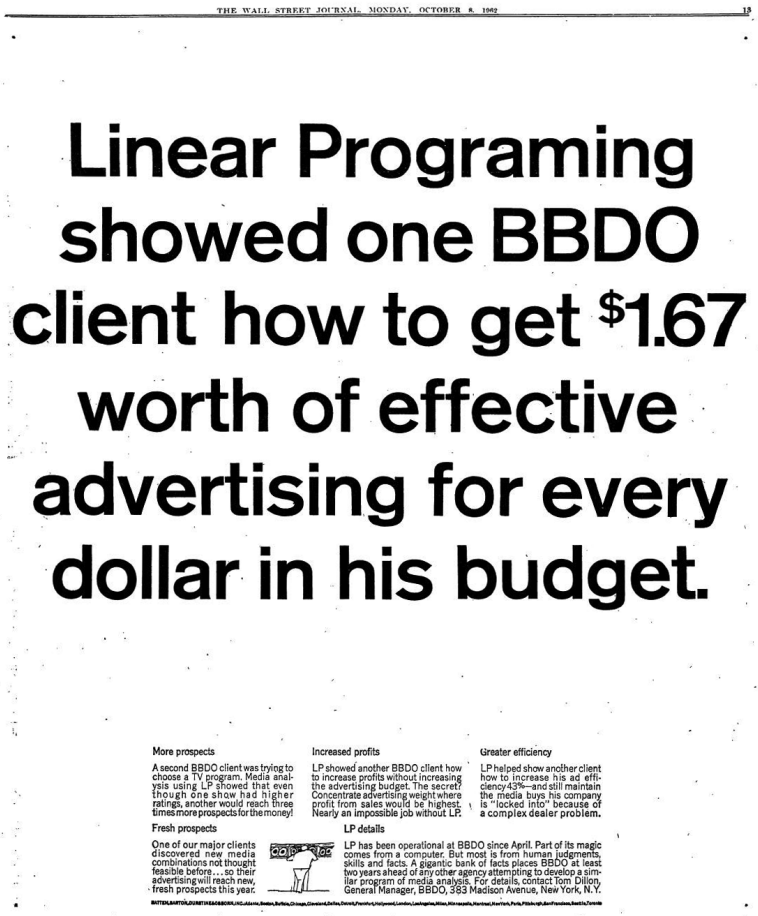


FIGURE 8.1
BBDO advertised its linear programming system with the promise of better ROI. (*Source: Wall Street Journal*, October 8, 1962, 13; reprinted with permission from BBDO)

audience. 'Probably' is necessary in this statement due to our present inability to measure accurately some of the important variables."[81]

Despite the caveats, mathematical programming looked like progress. Later media selection models tried to move the optimized value even nearer to marketing outcomes. The MEDIAC model, designed by John Little and Leonard Lodish and sold as a computer model utility to agencies, set a measure of market response as its objective function. Little and Lodish declared that their model stood out from others specifically because "the advertising

effectiveness process is treated in greater detail."[82] Agencies made similar claims about their own systems, and not just as theater for the trade press. A document detailing the procedures for using JWT's media planning system declared, it is "obvious . . . that new research data, combined with the computer, has increased the capability for evaluating media in terms directly related to marketing problems and to measure more exactly each medium's contribution to the plan."[83]

Nevertheless, analytical techniques could only go as far as measurement capabilities allowed. Behavioral data on media usage and product purchasing were what Thomas Hughes might have called a "reverse salient," a weak component that restricts a system's potential and is thus targeted for development.[84] "We know absolutely nothing about the effect of an advertising message," the manager of Y&R's Media Department admitted. "Measuring impact will have to be the next frontier of media research."[85] Applications of computers and mathematical models accentuated the need for that information. With widespread publicity about automated and optimal decision making, the same Y&R manager explained that "all of us will have to . . . more closely pinpoint the values which advertisers will receive for the advertising dollars they invest."[86] As an article in *Sponsor* magazine put it, "the harsh light emitted by computers" exposed the deficiencies of available data: "computers are forcing media departments to take a long hard look at the data that is being fed into them."[87] Recognizing that "nonsense" data inputs could only lead to "nonsense" computer outputs, an executive from Leo Burnett stressed the need for accurate and personal information. "To be really useful in handling complex media problems, the machines need reliable data on the effectiveness of actual exposure of advertising to real individuals in real households."[88]

Agency researchers, media directors, and management scientists all claimed that computers and mathematical models both demanded better data and stimulated their production.[89] Little called mathematical models "a stone in the shoe for better data," prodding management to measure all phenomena relevant to whatever relationships it wanted to explain, predict, or control. "The model forces explicit consideration of every factor it contains and so pinpoints data needs," he explained in a widely cited paper.[90] Models were like data wish lists, specifying what elements had to be accounted for and what measurements were required to act rationally within the defined reality. Of course, each model was itself a collection of strategic choices

about who and what mattered. And it was not computers and models per se that demanded data but rather the imperative to exploit (or at least appear to exploit) the perceived capacities of these expensive intellectual technologies. Still, the practical consequences were much the same.

Researchers who responded to these calls for data recognized advertising optimization as an intersection of management and behavioral sciences.[91] Marketing models developed by the former required "more sophisticated inputs" from the latter, meaning more behavioral data. As a marketing professor from Columbia University suggested in 1970, "A variety of operations research and management techniques lie fallow because of the lack of behavioral input."[92] By then, researchers at Stanford University, with funding from the Ford Foundation and the American Association of Advertising Agencies, were engaged in a "continuing program" of empirical measurement "to fill this void in behavioral information for advertising media models."[93] In particular, they were collecting data on the effects of advertising repetition for use in the MEDIAC online computer system. They used a mobile laboratory provided by the Foote, Cone & Belding agency to measure viewers' responses to repeated TV ad exposure. Interestingly, to distract participants from the true purpose of the experiment, these researchers claimed to be gauging reactions to a hypothetical home shopping system accessed via interactive cable TV.[94] As shown in the last chapter, shoppable electronic media were at the beginning of a winding march toward online buy-now buttons, which are, arguably, the clearest signal of attribution advertisers have. Fifty years later, most Americans not only use devices that let them close the loop between advertising and sales but also carry a digital marketplace, outfitted with behavioral sensors, everywhere they go. In the meantime, market researchers positioned themselves to see more links in the chain of advertising-sales causation by keeping an eye on what shoppers put in their carts.

FROM INSTRUMENTED MARKETS TO ADAPTIVE CONTROL SYSTEMS

Attribution is, essentially, an evidential paradigm that integrates observations of media usage and shopping behavior. The introduction of new technologies into either sphere creates opportunities to produce new data and restructure the terms of advertising deals, inching closer to the integration of media and marketplace measures. The pressure to account for attribution

tends to come from advertisers and agencies, but the weight sometimes falls on attention merchants. This pressure is absorbed with ambivalence. Media companies are not eager to make their advertising revenue conditional on sales outcomes. Broadcasters and publishers can reasonably deny any responsibility for the efficacy of advertisers' campaigns; their job is to assemble valuable consumers, and they want to be paid for the whole audience head count. That said, media firms have sought advantage by flaunting their alleged power to influence consumers. For example, WSM Nashville, home of the *Grand Ole Opry*, courted sponsors in 1945 by reimagining its call sign as "We Sell Merchandise."[95] And a 1946 promotion for NBC spot radio insisted that the network's stations "have a consistent habit of getting advertisers' products on the shopping lists of the buyingest people in the most moneyed markets."[96] These sorts of statements are especially pronounced when companies are trying to build or protect a medium's reputation as a reliable marketing technology.

Media companies have supported their claims with social-scientific evidence. In the early 1950s NBC financed a handful of studies on the sales effectiveness of television. Soon, organizations such as the newly created Television Bureau of Advertising (TvB) were crowing about TV's marketing power. At the 1955 convention of the National Association of Radio and TV Broadcasters, the TvB publicized a few favorable findings. For example, in a study conducted by Ernest Dichter's Institute for Research in Mass Motivations, grocery shoppers in five cities were asked to attribute the items they were buying to the "medium [that] influenced their purchase of the individual products." The participants sorted their items into bins representing newspapers, magazines, radio, or television. Shoppers reportedly attributed 54 percent of the items they bought to TV. Whatever its validity, the act of putting purchases into different media bins was a stark way of visualizing attribution.[97]

As manufacturers and merchants implemented universal product codes and optical scanning systems, advertisers looked to observe grocery aisles and cash registers in new ways. Management scientists saw enormous potential for in-store bar-code scanning to generate valuable marketing data and measure advertising effects. Electronic tracking of retail transactions provided a critical infrastructure for conducting controlled experiments to produce attribution claims. Together with the discriminating affordances of addressable cable television, scanning at the point of sale gave marketers a living laboratory to study advertising.[98]

By the 1970s, packaged goods companies were mining intelligence from "instrumented markets." In these cities, all the major grocery stores were equipped with optical scanners, and cable systems were capable of "splitting" subscribers into treatment and control groups and then distributing different advertisements to households within the same neighborhood. Researchers measured purchases using interviews and pantry audits, and stores in these test markets eventually introduced identification cards to recognize consumers and automatically document what they bought. By combining household-level measures of advertising exposure with observations of purchasing behavior, "a remarkably complete picture of the shopper's marketing environment is possible."[99] Within this naturalistic experimental setting, researchers could conclude that differences in relevant consumption behaviors across treatment and control groups were "attributable to the controlled television exposure."[100] Celebrating the combination of in-store scanning and control over advertising delivery, the president of the ARF wrote, "*These technologies have brought the power of the microscope to advertising research, along with enhanced experimental design capabilities, and increased productivity and analytic power*."[101]

This was a familiar area of interest for management scientists like John Little. The isolation of advertising effects was precisely what he and his colleagues had been attacking with OR/MS methods in the 1950s. Throughout the 1960s Little pursued this agenda by devising "adaptive control systems in marketing." Basically, he proposed a recursive process of building a model to represent a marketing process, continuously experimenting with advertising policies to generate data about consumer response, and using what was learned from those experiments to optimize the model and adapt advertising strategy. Describing how this approach should be applied to the problem of setting an advertising budget, Little and Russell Ackoff emphasized the importance of responding dynamically to marketplace feedback: "what we really want is automatic controls, the purpose of such controls being to keep the spending in each market as close as possible to the point of maximum profitability for the company."[102] They wanted something like programmatic advertising. The manager of marketing research at Coca-Cola, Malcolm McNiven, described Little's designs as possibly "the most fruitful approach for measuring effectiveness of advertising."[103] Little and his collaborators commercialized their products through a firm called Management Decisions Systems (MDS). MDS sold advertising models, analyzed

consumer behavior for marketers, and built management information and analytics software, including a program called EXPRESS, which MDS sold to Oracle for $100 million.[104] Retail tracking technologies presented another fertile area for the company.

Marketplace data represent "contact points with reality," Little said. "Whenever new measurement technologies appear, they create special opportunities for learning how the world works."[105] Writing with his student and MDS staffer Peter M. Guadagni, Little likened the improvement in measurement afforded by in-store optical scanning to Galileo's telescope.[106] These systems seemed capable of delivering a more powerful, dynamic view of consumption. Looking ahead from 1979, Little projected that within five to ten years the amount of transaction-generated data and the computer power available to analyze those data would increase by an order of magnitude.[107] The speed and scope of automated data collection would then permit management to pinpoint how sales are responding to advertising moment by moment, rather than looking back at recent sales. Retail tracking also facilitated the production of "longitudinal customer histories."[108] "The chief advantages of the scanner panels lie in their micro detail and competitive completeness," Guadagni and Little wrote. "People, not markets, respond to the actions of the retailers and manufactures."[109] By 1987, Procter & Gamble's manager of information services seemed to confirm Little's earlier projection: "Over the past five years, new ways of reading consumer behavior have emerged, and most are electronic; that will continue. That provides people who study consumer behavior an immense, rich new database."[110]

In 1985 MDS merged with Information Resources Inc. (IRI), whose BehaviorScan service was an industry leader in furnishing instrumented markets for companies to experiment with advertising and new products. Little joined the IRI board, and one of his students, Magid Abraham, later become IRI's president. (Abraham went on to found comScore, an online audience measurement firm.) IRI was doing so well that in 1987 Dun & Bradstreet tried to buy the company for $570 million.[111]

These integrations of media and shopping data came closest to determining advertising response. They also raised concerns about privacy.[112] In his exposé on database marketing, *The Naked Consumer*, Erik Larson writes, "The attraction of scanner technology is powerful. It lets companies observe market phenomena they previously couldn't have seen. It advanced the marketers far along in their century-long drive to turn their

art into a science."[113] Many advertising professionals were excited rather than concerned about exposing more of consumers' lives to detailed study. They saw an opportunity to finally access a supply of behavioral data worthy of their adaptive control systems and the conceit of optimization. As one agency executive said about retail scanners, "A device conceived for operational reasons to control inventory and to speed up and improve the pricing accuracy at the checkout will turn out to feed the marketing data base of the 1990s and beyond."[114]

FALLING OUT OF AND INTO FASHION

These rapid and granular measures of consumer response provided the data that futuristic media departments had been clamoring for since the 1960s. But, despite all the ballyhoo about technoscientific breakthroughs, by the time these data were widely available, the optimum-seeking models described throughout this book seemed like artifacts of the inflated expectations surrounding OR—a legacy of overpromising and underdelivering. During the 1980s and early 1990s, routine practice in media departments settled around software tools that were far less complex than the models designed by leading operations researchers. The latter aimed at the objectives and distinctions marketers desired, but their potential to extract new value was circumscribed by organizational conditions such as how attention merchants packaged their inventory. A management scientist at BBDO described this in 1981 as a "classic implementation problem," wherein "modeling specialists" had not adequately considered the workaday needs of media planners.[115] Furthermore, while the independent media buying agencies that rose to prominence in the 1970s and 1980s marketed their services *in part* around calculative expertise, they emphasized much more forcefully their ability to negotiate low prices. Clout and personal relationships figured into this style of buying more than strict rationality,[116] due in part to the concentrated power of media capital in the United States. The optimization models hyped in the 1960s and 1970s found wider use in Europe (albeit with American money), where more media buying and selling were done according to a rate card and where the political economy implied different bargaining relations.

But in the late 1990s, at another moment when technological, political, and industrial changes invited bold claims about progress, optimization

models once again enchanted the US advertising industry. Major advertisers, including the formidable Procter & Gamble, which had a $1 billion TV budget, openly demanded that their media agencies use optimization models, and those agencies focused more energy (at least in their public performances) on shifting the objective function in their planning toward closer approximations of ROI. Audience fragmentation was intensifying; this complicated existing business practices but also implied lucrative possibilities to discriminate among consumer populations. These challenges and opportunities opened a problem space that renewed the salience of optimization and accountability. As the director of North American media services at JWT put it in 1998, "Why we're all so concerned about optimizers [and] return on investment is we know we're losing the mass media and we have to change and take a look at tomorrow, and those are the tools that help us look at tomorrow."[117]

The future was up for grabs again. "The next generation of optimizers will seek to match viewing information with purchase data," an article in *Fortune* explained. "Eventually, buyers would like to determine with some exactitude just how their spending on commercials translates into sales."[118] Leading agencies and media buying services continued investing in research to find out "if and why some kinds of TV exposures produce greater consumer response—and to quantify these differences to make their optimizers smarter." As one expert put it, these studies "will then take us closer to optimizing the Big Kahuna—product sales."[119]

The two main strands of OR/MS in advertising—optimizing media selection and accounting for advertising effectiveness—were recombined. The advertising industry was becoming completely interwoven with direct marketing, electronics and software companies, and proliferating research and information management services. It rode this wave into the twenty-first century, propelled by the warm winds of state-sanctioned internet commercialization, financial speculation, and an unregulated data buffet. Over the next two decades, advertising money flowed toward digital media that promised to produce more complete and perfect records of advertising events and consumer behaviors.[120] And as more and more shopping moved online, marketers believed that the entire chain of causation between advertising and sales could be captured within a digital evidential paradigm. Digital ad servers and social media platforms are evidence machines, combining unprecedented accountability with the other affordances described in previous

chapters. Today's adtech materializes the spirit of using adaptive control systems to measure and maximize ROI.

While the data and analytics supporting attribution remain riddled with problems, the advertising industry has, in practice, implemented an evidential paradigm that integrates records of media and marketplace activity. Companies like Google, Meta, TikTok, and Amazon market their advertising businesses around their fortressed access to observations of consumer behavior, their machine-learning capacities (which benefit from huge training data sets), and their power to orchestrate activities and configure choice architectures. Recently, they have been angling to conduct more consumer purchasing directly on their platforms, in the same environments where they serve ads. These companies vary in how much they prioritize and succeed at this effort, but overall, they come as close as anyone to fulfilling the dream of enclosing consumers within management science machines.

Platforms are the envy and the economic gravity of the advertising world. Their size and their integrations with partners that depend on them (e.g., publishers, merchants, app makers) help them account for a massive inventory of variables related to the expected value of consumers and the apparent success of advertising events in delivering desired outcomes. Their attribution measures are recycled back into automated decision systems, ostensibly optimizing ad spending and distribution to achieve programmed objectives. Platforms can also break up micromoments and microbehaviors into salable advertising opportunities. Their abilities to account translate into abilities to bill.

A great irony, however, is that as these marketing intermediaries built the accountable systems advertisers had been dreaming of for decades, those advertisers and their agencies lost control. For starters, the documentation of audience attention and behavior has shifted away from ratings produced by third-party measurement firms and toward server logs generated by whichever party serves an ad. The promise here is a full census measure of advertisement distribution; however, it also means that those accounts are produced through a sort of internal auditing by adtech intermediaries that are direct parties to these transactions, rather than an ostensibly neutral arbiter.[121] Given the scale and opacity of digital advertising supply chains, advertisers often have no idea where their ads appear. The business of fabricating evidence of audience attention or behavior, though technically capable of accounting for more events than ever before, has become less

transparent to advertisers and publishers. The authoritative production and circulation of this information are critical levers of power in these industries, and adtech intermediaries have claimed this power as their own—even though they seem incapable of knowing what happens with all the data they collect.[122]

Furthermore, the complexity of models and analytical techniques and the relations of data generation and control prevent advertisers and agencies from confidently adjudicating attribution claims. The drive for accountability—where advertisers can monitor, measure, and record all consumer behaviors in response to advertising—has empowered the intermediaries that appear most capable of untangling the knot of attribution. Advertisers asked technical experts to get to the bottom of advertising effectiveness, and eventually the experts dug so deep that they disappeared from sight. Optimization models designed by management scientists in the 1960s gave accounts of *process*, accounts that confirmed rational calculations and commitments to objective values. Impressing with their technique, they legitimated uncertain decisions whose desired outcomes were beyond measurement. Today's management science machines give accounts of *outcomes*—in fact, they are constantly generating accounts (of patterns, correlations, deviations, value). But the processes by which they engineer those outcomes may be undisclosed or, especially with machine learning, impossible to explain. The objective function and the focus of measurement have shifted toward marketing outcomes, as advertisers hoped for, but authority and trust shifted too. The search for exhaustive detail has yielded mystification and made it a source of market power.

It is worth noting, as well, that ad fraud, totaling tens of billions of dollars a year, is the flip side of a business built around the production of accounts. Its whole basis is fabricating information to imitate legitimate evidence of attention, behavior, or value. Fraud has thrived in a business culture that fetishizes documentary records and metrics and the success stories they help tell.

CONCLUSION

In 1964 Charles K. Ramond, the ARF's technical director (and formerly a researcher at DuPont), wrote a flattering prediction about how a scientific attitude would turn advertising into a prestigious modern profession. He wrapped his forecast in a fanciful conceit—presenting it as a letter from

the year 1999, obtained via time machine, from historians who explained "how the advertising business was revolutionized by the simple expedient of measuring the profitability of its expenditures." Looking back from the edge of a millennium, these imagined historians wrote, "Advertising became a measurable contributor to the business firm late in the twentieth century. Until that time, virtually no manufacturer had any real information about the economic effects of the money he spent to advertise." The industry crawled out of the dark ages when "several major U.S. companies—among them Du Pont, Ford, General Electric, and Scott Paper—began to investigate systematically the relationships between advertising expenditures and the sales they caused." Their successors committed to gathering "continuous experimental evidence," and eventually managers possessed "rapid knowledge of the consequences of their marketing decisions (artfully presented on 3-D color television)." By the end of the century, "documentation of economic effects" precipitated the "gradual disappearance of objectionable advertising"—a reasonable encapsulation of the "relevance" argument mobilized today to defend behavioral targeting. It's an imaginative little scene, and it appears prescient. But like most works in this genre, it was as much a suggestion as a forecast.[123]

Today, sci-fi contrivances are apparently unnecessary. Enthusiasts say the future is now. Datafication, analytics, and administrative capacities let marketers account for the value of specific consumers and the productivity of advertising efforts. By 2017, an executive at IBM's artificial intelligence (AI)–focused Watson Advertising declared demographic targeting "a kind of historical artifact" reflecting the limits of what he described as paper-based means of information and transaction processing. Marketers and media companies no longer needed to use demographic categories to simplify human behavior and identity and to package people into standardized bundles, he claimed, "now that technology and infrastructure allow us to . . . really understand how the individual functions—what they buy, where they go, what their interests are, what media they're consuming." With AI and big data, "now we can try to at least calculate the value of the individual and what that represents for a marketer at a moment in time and at a place."[124]

Accountability bookends advertising's calculative evolution across the second half of the twentieth century. The dream of determining the sales effects of advertising was a primary entry point for OR/MS in marketing. Advertising has always tried to manage demand; OR/MS spearheaded

technocratic efforts to rationalize the sphere of consumption and absorb it into the scope of management, optimizing consumer behavior for private profit. The proliferation of measurement instruments—from the digitization of retail environments through the popular adoption of mobile devices and the expanding internet of everything—has been shadowed or even spurred by aspirations to control the circulation of commodities. Fantasies of perfect accountability run through many designs to make media into extensions of the marketing system.

This chapter has shown how those fantasies found material, intellectual, and organizational force. The attitude and techniques of cost accounting inflected the OR/MS approach to advertising, favoring the seemingly concrete behavioral metrics of direct marketing over the psychological or cultural effects of branding. OR/MS's expertise excited advertisers' desires to measure and predict the effectiveness of their advertising policies and to appraise customers' value more exactly. Determining ROI was the fundamental mandate for the consulting work operations researchers sold to advertisers. For advertising agencies, which were responsible for deciding how to allocate advertisers' money, these pressures toward rationalization and efficiency manifested in the work of aligning media selection with clients' marketing objectives. Accountability became a buzzword in advertising management in the early 1960s. It stood for the scientific and data-driven stewardship of clients' ad budgets, squeezing the most value out of every dollar spent. The computer-powered optimization models designed to automate media selection materialized this spirit of accountability and ROI-centered management.

The shortcomings of agencies' initial efforts accentuated the urgency of producing behavioral data—precise and persistent records of what kinds of media people consumed and what goods and services they bought. Investments in complex models and expensive computers, and the urge to exploit their capabilities, amplified a datafication imperative in advertising. The desire to incorporate finer and more comprehensive behavioral measures into media buying and selling was in tension with computational limits and pressures to standardize data. Simple models of marketing processes sacrificed realism, but they were easier to operationalize and understand. How to accommodate more of reality into the framework of routine planning, evaluation, and action was a challenge for management information systems and the culture and politics of organizations. It was

also a point of friction between advertising buyers and sellers—negotiating how an expanding inventory of consumer behaviors and attributes could be packaged into salable evidence of audience attention or action. Advertising transactions needed to accommodate differently datafied consumers and events.

These challenges were not resolved until well after OR/MS had faded into the background in advertising. But the affordances that operations researchers and agency media departments constructed around computers and optimization techniques helped break open a particular horizon where surveillance, prediction, and rational management seemed desirable and necessary. It also helped empower and reproduce a class of techno-scientific experts now referred to as "math men." The OR/MS inflection in advertising and media, for all its failures and false starts, was an engine driving toward more data creation and use and toward a corporate culture where behavioral evidence became an authoritative and expected element of optimal decision making. Management technique—combining computerization, operations research, and mathematical modeling—suggested the potential to refine accounting abilities in advertising. The commitment to optimization was not just data driven; at this pivotal moment in advertising's history, it was dramatically data *driving*.

The MIT Press would like to thank the anonymous peer reviewers who provided comments on drafts of this book. The generous work of academic experts is essential for establishing the authority and quality of our publications. We acknowledge with gratitude the contributions of these otherwise uncredited readers.

This book was set in Stone Serif and Stone Sans by Westchester Publishing Services.

Library of Congress Cataloging-in-Publication Data

Names: McGuigan, Lee, 1986– author.
Title: Selling the American people : advertising, optimization, and the origins of adtech / Lee McGuigan.
Description: Cambridge, Massachusetts : The MIT Press, [2023] | Series: Distribution matters | Includes bibliographical references and index.
Identifiers: LCCN 2022037239 (print) | LCCN 2022037240 (ebook) | ISBN 9780262545440 (paperback) | ISBN 9780262374231 (epub) | ISBN 9780262374248 (pdf)
Subjects: LCSH: Internet marketing—United States. | Internet advertising—United States. | Advertising—United States. | Digital media—United States. | Social media—United States.
Classification: LCC HF5415.1265 .M367 2023 (print) | LCC HF5415.1265 (ebook) | DDC 658.8/72—dc23/eng/20230103
LC record available at https://lccn.loc.gov/2022037239
LC ebook record available at https://lccn.loc.gov/2022037240