XXIX International Scientific Conference
Strategic Management
and Decision Support Systems
in Strategic Management
SM2024

Subotica (Serbia), 17-18 May, 2024

Nenad Djokic
University of Novi Sad, Faculty of Economics in Subotica
Subotica, Serbia
nenad.djokic@ef.uns.ac.rs

Nikola Milicevic
University of Novi Sad, Faculty of Economics in Subotica
Subotica, Serbia
nikola.milicevic@ef.uns.ac.rs

Ines Djokic
University of Novi Sad, Faculty of Economics in Subotica
Subotica, Serbia
ines.djokic@ef.uns.ac.rs

MEDIA MIX BUDGET ALLOCATION

Abstract: An important topic within marketing communications management is related to media mix budget allocation. In addition to traditional approaches, the new circumstances in which there is the use of digital marketing and the availability of a significantly greater volume of data yielded new possibilities in approaching the topic. Furthermore, one should not neglect the privacy regulations affecting future data availability. In all those considerations, the emphasis on different media effectiveness and its measurement is crucial. In this paper, the authors present different approaches to media mix budget allocation. The secondary research is performed by analyzing scientific papers related to the topic.

Keywords: Marketing communications, Media mix, Media effectiveness; Budget allocation

1. INTRODUCTION

As Belch and Belch (2021) suggest planning is essential for creating and executing a successful integrated marketing communications (IMC) program. The process is guided by an integrated marketing communications plan, which serves as the framework for developing, implementing, and managing the organization's IMC efforts. Hereby, when reviewing the IMC plan, it can be concluded that it consists of (Belch & Belch, 2021, p. 33):

- Promotional program situation analysis
- Analysis of communication process
- Budget determination
- Development of IMC program
- Integration and implementation of MC strategies
- Monitoring, evaluation and control of IMC program

In addition, mentioned authors present that, when considering budget determination, there are two topics that should be in a focus: setting tentative MC budget and allocating tentative budget.

When it comes to the topic of setting the budget, just as an illustration of the complexity of the issue, Danenberg, Kennedy, Beal and Sharp (2015) can be cited when suggesting that in the case of advertising, there are several available methods to assist with budgeting, such as marginal analysis, elasticities, econometric modeling, and game theory approaches. They also add that despite these advanced techniques, the use of heuristics remains common and can be advantageous for accurate forecasts. Hereby, one prevalent heuristic is setting the advertising budget as a fixed percentage of sales.

Simmilar complexities can be identified in regard to budget allocation. Hereby, again as in illustration, Saboo, Kumar and Park (2016) can be cited. These authors stress that marketing resource allocation has become increasingly important as managers face greater pressure to achieve results with limited budgets. As firms constrain their marketing spending, marketers are challenged to optimize the effectiveness of their marketing investments. They also point out that scholars have contributed extensively to this area of study, offering both methodological and substantive insights into the complex decisions involved in marketing resource allocation. The overarching theme of such research is to evaluate how marketing actions influence consumer demand and subsequently adjust resource allocation across various

dimensions such as media, channels, geographic regions, product lines, customer segments, and more, with the goal of enhancing firm value. The literature in this field emphasizes the need to understand the impact of different marketing strategies and tactics on consumer behavior and business outcomes to inform more strategic and efficient allocation of marketing resources. In the realm of marketing resource allocation, scholars have proposed various transactional, shopping, attitudinal, and organizational characteristics to explain differences in consumer purchasing behavior. These characteristics include factors like recency, frequency, and monetary value of transactions, shopping behaviors such as return behavior or use of multiple channels, and attitudinal factors like satisfaction and loyalty. Additionally, organizational marketing efforts are considered in understanding consumer purchase patterns. Using these insights, scholars have explored how marketing resources should be distributed across different customer segments and marketing activities, such as customer acquisition versus retention, advertising versus sales efforts, or value creation versus appropriation. They have also considered market or geographic allocations. Many of these tools and methodologies developed by scholars have been made accessible to managers to assist them in making informed resource allocation decisions. Despite these advances, the research indicates that companies often continue to allocate resources based on historical patterns and rules of thumb rather than adapting their allocations strategically based on current marketplace dynamics. This discrepancy highlights a gap between theoretical understanding and practical implementation in marketing resource allocation, where strategic reallocation based on market considerations is recognized as delivering superior returns but is not consistently applied in practice. Addressing this gap could lead to more effective resource allocation strategies and improved business outcomes for firms.

In the light of previous considerations, the paper is divided in two parts. First parts deal with promotional budgeting in general discribing traditional approaches still widely used. The second part of the paper is devoted to two innovative approaches used for media budget allocation – namely, attribution and marketing mix modelling.

2. TRADITIONAL APPROACHES OF DETERMINING PROMOTIONAL BUDGETS

There are two categories that can be identified within the traditional promotional budgeting approaches – top-down and bottom-up - and individual methods belonging to them will be presented in this section according to Belch and Belch (2021, pp. 237-248). In the top-down approach, a predetermined budget is established, usually at an executive level, and then distributed among various departments within the organization. These allocations lack a solid theoretical foundation and are often based on subjective judgments. Furthermore, a significant limitation is their tendency to disconnect budgetary allocations from specific objectives and corresponding strategies. Methods within the top-down category include the affordable method, arbitrary allocation, percentage of sales, competitive parity, and return on investment (ROI). In contrast, a more effective approach involves aligning the firm's communication objectives with the allocated budget, and belongs to build-up methodologies. One such method is the Objective and Task Method, which emphasizes determining communication objectives and the allocation of resources accordingly.

The Affordable Method considers the firm determining the allocation of funds across different areas such as production and operations, with the remaining sum is allowed for advertising and promotion, based on what is assessed affordable. However, this method neglects to consider the specific tasks to be undertaken by the advertising/promotions function, which can result in the likelihood of both under- and overspending, given the absence of established guidelines for assessing the impact of various budget allocations. While characteristic of small firms, it is also employed by larger enterprises, particularly those not driven by marketing and lacking comprehension of the significance of advertising and promotion. Moreover, during challenging market conditions characterized by declining sales or profits, this method may lead to budget reductions, contrary to the necessity of increased investment in such circumstances.

Arbitrary Allocation represents a weaker approach compared to the Affordable Method for budget establishment, as it lacks a substantial theoretical foundation, often relying solely on management's subjective judgment to determine the budgetary amount. This method offers no advantages, as it lacks systematic planning, objective setting, and consideration of the fundamental concepts and objectives of advertising and promotion. Despite its deficiencies, this approach persists, typically driven by a managerial belief that some expenditure on advertising and promotion is necessary, without a clear rationale for the chosen budgetary figure.

The Percentage of Sales method is widely used for budgetary allocation, especially in large firms, where the advertising and promotions budget is tied to product sales. Management determines this budget either by applying a percentage to sales revenue or by allocating a fixed amount of the unit product cost to promotion and then multiplying it by the number of units sold. Alternatively, a variant of this method relies on a percentage of projected future sales as the basis. This approach offers an advantage over basing the budget solely on past sales, as it requires forecasting future sales, thereby incorporating market dynamics into the budgeting process. Advocates of the Percentage of Sales method highlight its financial logic, as it maintains advertising expenditure within reasonable bounds, ensuring adequate funds to cover the budget while allowing for adjustments in response to sales fluctuations. Moreover, it is straightforward to implement and provides stability, enabling managers to anticipate budgetary parameters. However, several disadvantages undermine its efficacy. First, it establishes an opposite causal relationship between advertising and sales, also treating advertising as an expense rather than an investment. Additionally, it lacks flexibility regarding changes in strategy, preventing firms from allocating additional funds for aggressive marketing approaches. Moreover, it may lead

to misallocation of funds, with products experiencing low sales potentially receiving inadequate promotional budgets, while successful products may have excess funds. The method also poses challenges for new product introductions, particularly in the absence of sales data for forecasting. Furthermore, it complicates the issue during periods of declining sales, as budget cuts prevent efforts to reverse the downward trend. Although the Percentage of Future Sales method has been proposed as a solution, challenges in forecasting and uncontrollable market factors limit its effectiveness.

The Competitive Parity method leverages insights into competitors' advertising expenditures, which are often obtained from competitive advertising information providers, trade associations, and industry periodicals. Larger corporations may subscribe to services like Competitive Media Reporting, which tracks advertising expenditures across various media for the top 1,000 companies. On the other hand, smaller firms may employ clipping services to gather competitors' ads from local print media, facilitating the estimation of cumulative advertising costs. Managers utilizing the competitive parity approach establish budget amounts by aligning with competitors' percentage-of-sales expenditures, under the premise that this practice taps into industry wisdom and promotes market stability by discouraging aggressive marketing tactics. This method assumes that competitors' spending patterns reflect effective marketing strategies and aims to minimize marketing conflicts. Despite its perceived benefits, the competitive parity method has notable drawbacks. Firstly, it overlooks the specific objectives that advertising and promotions are intended to achieve, as well as the individual problems and opportunities they address. Secondly, it presupposes that similar expenditure levels equate to equal effectiveness, disregarding the impact of creative executions, media allocations, and product quality variations among firms. Moreover, it fails to anticipate changes in competitors' strategies or market dynamics, potentially leading to competitive disadvantages. Additionally, there is no guarantee that competitors will maintain consistent spending patterns, rendering the method susceptible to unforeseen shifts in promotional activities. In practice, few firms rely solely on the competitive parity method for budget allocation. Instead, it is often employed in conjunction with other approaches such as the percentage-of-sales method.

The Return on Investment (ROI) budgeting method views advertising and promotions as investments, with budgetary allocations considered as investments that yield returns. Similar to other facets of the firm's activities, advertising and promotion are anticipated to generate a specific return. Despite receiving considerable attention from practitioners in recent years, there remains disagreement regarding the appropriate measurement of ROI. While the ROI method appears promising in theory, in practice, assessing the returns generated by promotional efforts is often challenging, particularly when sales remain the primary metric for evaluation. Consequently, although managers invariably seek to ascertain the returns on such expenditures, determining the precise return remains elusive and contingent upon the criteria utilized to gauge effectiveness.

The Objective and Task Method relies on the relationship between objective setting and budgeting, emphasizing that these processes should be simultaneous rather than approached sequentially. Establishing a budget without clear objectives is challenging, just as setting objectives without considering available financial resources lacks coherence. This method employs a buildup approach comprising three steps: delineating the communication objectives to be achieved, identifying the specific strategies and tasks necessary to accomplish these objectives, and estimating the costs associated with executing these strategies and tasks. The total budget is then determined by aggregating these costs. A significant advantage of the Objective and Task Method is its alignment of the budget with the objectives to be achieved. However, a notable drawback lies in the difficulty of determining the requisite tasks and their associated costs. This challenge is diminished when past experience can serve as a reference, either with the existing product or a comparable one in the same product category. Nonetheless, it remains particularly challenging for new product introductions. Consequently, budget setting using this method is comparatively more complex and less stable than some of the previously discussed approaches.

3. ATTRIBUTION

A detailed description of attribution is provided by Schultz and Dellnitz (2018) and the first part of this section is based on their explanation. Namely, they first stress that customers engage with brands through various touchpoints across different channels and media platforms, establishing multiple interactions before making online purchases. These interactions, occurring through diverse channels, influence subsequent customer-brand engagements. The sequence of these touchpoints constitutes what is commonly termed as the "customer journey". The proliferation of marketing tools presents a challenge for advertisers in discerning the individual impact of each instrument and strategizing its future utilization. Advertisers seek insights into the contribution and efficacy of each marketing instrument towards specific advertising objectives. The digital landscape provides ample tracking data on online consumer behavior, enabling advertisers to track individual customer journeys. Consequently, online advertising analysis primarily operates at the individual user level, as opposed to traditional aggregate-level performance analysis.

In order to comprehend the influence of various touchpoints on predefined outcomes, advertisers employ attribution, a process of assigning value to each touchpoint. Attribution models offer a framework for distributing contribution values across multiple touchpoints within a customer journey. Thus, attribution modeling significantly impacts the assessment of marketing channels used. These models facilitate the understanding of customer behavior, the interplay between marketing channels, enhance budget allocation, and ensure marketing accountability. Generally, attribution models

refute the notion that only the first or last touchpoints are solely responsible for customer journey outcomes; instead, intermediate touchpoints also play significant roles.

Schultz and Dellnitz (2018) also add that attribution models can be broadly categorized into heuristic and analytical types. Heuristic attribution models employ simple rule-based approaches, such as first touch, last touch, linear (equally weighted), time decay, and u-shaped (position-based) attribution. In contrast, analytical attribution models utilize data-driven methodologies like logistic regression, time series analysis, and Markov chains.

The primary aim of attribution models is to enable advertisers to allocate marketing budgets based on the impact of marketing channels on customer journey outcomes. However, if consumer behavior is more intricate than assumed by heuristic models, there's a risk of misallocating marketing budgets.

To these considerations should be added the research of Danaher and van Heerde (2018). The focus of the discussion revolves around the appropriateness of using attribution for media allocation decisions, with the conclusion being that attribution is not suitable for this purpose. The authors argue that although attribution and profit-maximizing allocation of a fixed budget may appear similar, they represent fundamentally different concepts. Attribution entails providing a descriptive summary of each medium's relative contribution to a purchase, whereas profit-maximizing allocation involves determining the optimal weight for each medium to maximize profit. To conduct a thorough comparison between attribution and profit-maximizing allocation, the authors suggest formalizing both concepts. While the marketing literature typically relies on formal optimality principles for allocation decisions, the concept of attribution lacks a formal definition within this literature, leading to ambiguity. To address this gap, the authors propose a new, formal expression for calculating attribution based on each medium's incremental contribution to purchase probability. This mathematical formulation aims to clarify and refine the concept of attribution, enabling a deeper understanding of its relationship with allocation approaches in media planning and budget optimization. Ultimately, this formalization enhances precision and aids in distinguishing the similarities and differences between attribution and allocation strategies in marketing decision-making.

4. MARKETING MIX MODELLING

The term marketing mix modelling is often used interchangibly with media mix modelling. Although their scope is different, they deal with rather simmilar topics. The explanation of that topic is based on Jin, Wang, Sun, Chan and Koehler (2017).

Media mix models (MMM) are tools used to analyze how media spending impacts sales and to optimize the distribution of spending across different media channels for maximum effectiveness. Typically, these models work with aggregated data on a weekly or monthly basis, covering national or regional levels. The data they use encompasses various elements like sales figures, pricing, product distribution, media expenditure across different channels, and external factors such as economic conditions, weather, seasonal trends, and competitive dynamics. These models often rely on regression analysis to establish causal relationships from observed correlations. Conducting randomized experiments to gather such data is often impractical and costly when dealing with multiple media channels at scale. In the context of decision-making within these models, sales response to media variables is typically assumed to be linear. However, this linear model has limitations, particularly in accounting for ad saturation and diminishing returns as media spending increases — a phenomenon referred to as the shape effect. Moreover, the models usually only capture the immediate impact of advertising, focusing on the change in sales during the period when the advertisement is running. However, it's widely recognized that advertising also has a delayed impact or carryover effect, where its influence extends beyond the immediate exposure period. This delayed effect can be due to consumers taking time to respond to the ad, delaying purchases based on inventory levels, or making purchases influenced by interactions with others who saw the advertisement earlier.

In their paper, Chan and Perry (2017) delve into the challenges that compromise the reliability of Marketing Mix Models (MMMs) when applied to observational data, issues which are commonly faced by modelers but often overlooked in discussions with end-users. They identify three primary areas of concern: data limitations, selection bias, and modeling complexities.

Firstly, data limitations pose a substantial obstacle. This includes issues such as a scarcity of data, correlated input variables, and a restricted range of data. Limited data availability and diversity can hinder the accurate estimation of model parameters and relationships.

Secondly, selection bias emerges as a critical issue affecting the validity of MMM estimates. This bias occurs when a media input variable is associated with an unobservable demand driver that influences sales. If this influential variable is not included in the regression analysis, the model struggles to attribute sales accurately between media channels and underlying demand factors.

To address these challenges, the authors advocate for improvements in both data quality and modeling techniques. They highlight the potential impact of adopting better models to enhance MMM reliability.

One proposed modeling approach is the Bayesian method. The benefits of Bayesian modeling include the ability to incorporate informative priors derived from various sources, handle complex models effectively, report on parameter and model uncertainties comprehensively, and propagate uncertainty in optimization statements.

Additionally, the paper discusses category models as a means to introduce more data and variability into MMMs. By pooling data from multiple brands within the same product category, the model can leverage more independent variability, assuming that different brands operate with distinct advertising strategies and execution.

Another strategy involves using sub-national data (geomodels), which allows for more granular analysis at the city, county, province, or state level. This approach can reduce model uncertainty and enable more effective parameter estimation and budget optimization.

The authors emphasize the importance of control variables, particularly in mitigating selection bias. For instance, in estimating Return on Advertising Spend (ROAS) for paid search advertising, incorporating search volumes for relevant queries as a control variable can help address underlying demand factors.

To capture complex conditional dependencies, especially related to media effects, the authors suggest employing graphical models. These models can express dependencies between observed and unobserved variables, providing a more realistic framework compared to traditional regression approaches.

Finally, the paper underscores the value of simulation studies to evaluate model performance under different scenarios. By using simulators to generate datasets that mimic real-world conditions, modelers can test and refine MMMs under various assumptions and assess their robustness across different marketing environments.

5. DISCUSSION AND CONCLUSIONS

The paper discusses the significance of media mix budget allocation as well as determining promotional budget in marketing communications management. It presents traditional approaches in promotional budget allocation first. It also highlights the impact of digital marketing and the vast amount of data now available, which has opened up new possibilities for budget allocation strategies. Hereby, the special emphasis is on attribution and marketing mix modelling. These insights arise from secondary research conducted through the analysis of scientific papers on the topic.

The knowledge regarding described topics can be of special importance not only in academic society but in the applied field as well. Future researches could provide more detailed explanations regarding each of individual topics discussed within this paper.

REFERENCES

Belch, G. E., Belch, M. A.. (2021). *Advertising and Promotion: An Integrated Marketing Communications Perspective* (12th edition). New York: McGraw-Hill.

Danenberg, N., Kennedy, R., Beal, V., & Sharp, B. (2015). Advertising Budgeting: A Reinvestigation of the Evidence on Brand Size and Spend. *Journal of Advertising, 45* (1), 139–146. https://doi.org/10.1080/00913367.2015.1090938

Saboo, A. R., Kumar, V., & Park, I. (2016). Using Big Data to Model Time-Varying Effects for Marketing Resource (Re)Allocation. *MIS Quarterly, 40* (4), 911–940. https://www.jstor.org/stable/26629682

Schultz, C. D., & Dellnitz, A. (2018). Attribution Modeling in Online Advertising. In K. Yang (Ed.), *Multi-Platform Advertising Strategies in the Global Marketplace* (pp. 226-249). IGI Global. https://doi.org/10.4018/978-1-5225-3114-2.ch009

Danaher, P. J., & van Heerde, H. J. (2018). Delusion in Attribution: Caveats in Using Attribution for Media Budget Allocation. *Journal of Marketing Research, 55* (5), 667–685. https://doi.org/10.1177/0022243718802845

Jin, Y., Wang, W., Sun, Y., Chan, D., & Koehler, J. (2017). *Bayesian methods for media mix modeling with carryover and shape effects.* Retrieved March 31, 2024 from Google Research: https://research.google/pubs/bayesian-methods-for-media-mix-modeling-with-carryover-and-shape-effects/

Chan, D., & Perry, M. (2017). *Challenges and opportunities in media mix modeling.* Retrieved March 31, 2024 from Google Research: https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/45998.pdf