The Art and Science of Marketing: Building the Ideal Media Mix Model

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ABSTRACT

In an era of fractured media landscapes and fleeting consumer attention, crafting the ideal marketing media mix has become an intricate puzzle. This paper navigates the labyrinthine path towards an effective and dynamic blend of channels, ensuring brand messages resonate with the ever-evolving digital audience. By prioritizing audience understanding, aligning with strategic goals, selecting the right channels, and implementing machine learning based modeling, brands can orchestrate a symphony of strategies that captivate consumers and drive meaningful results. The paper also emphasizes the need for data-driven decision-making and continuous optimization of the media mix in an ever-changing marketing environment

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Introduction

Grabbing a user's attention amidst a sensory overload requires mastering the art of the marketing media mix – a delicate balance of channels while leveraging data-driven insights. This paper delves into the intricacies of this dynamic equation, uncovering the principles that guide brands towards a mix that resonates with their target audience and achieves their strategic objectives. Building an effective media mix revolves around the following aspects:

- Understanding your audience: At the core of any effective marketing media mix is a deep understanding of the target audience. Demographics, psychographics, interests, behaviors, and media consumption patterns must be analyzed. This helps determine which media channels are most likely to resonate with the intended audience and what types of messaging will be most effective
- Clarity of marketing goals: The marketing media mix should be closely aligned with specific campaign objectives. Different media channels have varying strengths and weaknesses when it comes to achieving different goals
- Evolving media landscape: Marketers must keep up with the ever-changing media landscape. Traditional channels such as television, radio, and print still hold value and are also evolving to keep up with the changing environments. Digital marketing continues to gain significant ground and lead in most areas, offering granular targeting capabilities, advanced measurability, and opportunities for greater personalization. Agile approach to marketing to refresh media mix at regular cadence as well as refreshing the model at regular cadence will help the marketers stay close to the consumer needs as well as show effective business results

- Budget allocation: Marketers need to balance reach and frequency against costs to determine an affordable yet effective mix. It's essential to allocate resources strategically across channels that align closely with campaign objectives and have a proven track record for reaching the intended audience.
- Application of Machine Learning in MMM: The emergence of machine
- learning has triggered a revolution, achieving higher accuracy, and insights into this crucial marketing domain. It enables marketers to process complex data, non-linear and real-time data, efficiently.

Related Work
Before Machine Learning

In 1929, the Harvard Business School investigated whether common patterns existed within the marketing expenses of food manufacturers. Nearly twenty years later, James Culliton replicated the study with a larger sample and refined methods, but reached the same conclusion: no predictable patterns emerged. This finding inspired Culliton's metaphor of the business executive as a creative "mixer of ingredients," adapting strategies to unique circumstances [1].

The Marketing Mix (the 4Ps) is a foundational framework popularized by McCarthy in the 1960s. It guides marketers in strategically crafting the product, price, place (distribution), and promotion mix. This careful alignment aims to satisfy the target audience while achieving the company's goals [2].

Econometric models that measured the impact of media on sales were enhanced according to seven patterns of response to advertising. Those patterns were named current, shape, competitive, carryover, dynamic, content and media effects (Tellis, 2006) [2].

Evolution of Media Mix with Machine Learning

Over the past few years, fitting models using a Bayesian framework has been a suggested methodology by researchers [2].

Today, data collection, integration and tracking is automated with CRM systems, customer data platforms and web analytics.

Cloud computing powered models are now more flexible, fast and easy to update. Marketing teams with lesser statistical expertise can also leverage automated media mix models.
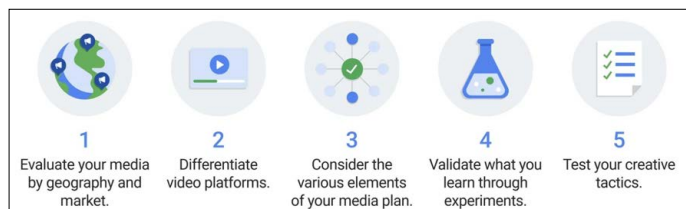

Figure 1: Phases of Media mix Modeling [3]

Case Study and Implementation

Our dataset contains the marketing expense data for numerous campaigns, with channel week granularity. It is ideal for our research in business analysis and market mix modeling techniques. This dataset contains 3051 rows and 9 columns. The dataset spans 113 weeks, beginning in January 2018 and ending in February 2020. It incorporates spending data from eight media channels, including Facebook, Google search impressions, email impressions, YouTube (paid and organic), affiliate channel views, and overall views. It also contains sales data against those spending.

| Calendar_Week	Paid_Views	Organic_Views	Google_Impressions	Email_Impressions	Facebook_Impressions	Affiliate_Impressions	Overall_Views	Sales
2018-01-06	392	422	408	349895.0107	73580	12072	682	59417
2018-01-13	787	904	110	506270.2176	11804	9499	853	56806
2018-01-20	81	970	742	430042.1538	52232	17048	759	48715
2018-01-27	25	575	65	417745.6658	78640	10207	942	72047
2018-02-03	565	284	295	408505.8012	40561	5834	658	56235

Figure 2: Overview of the Dataset
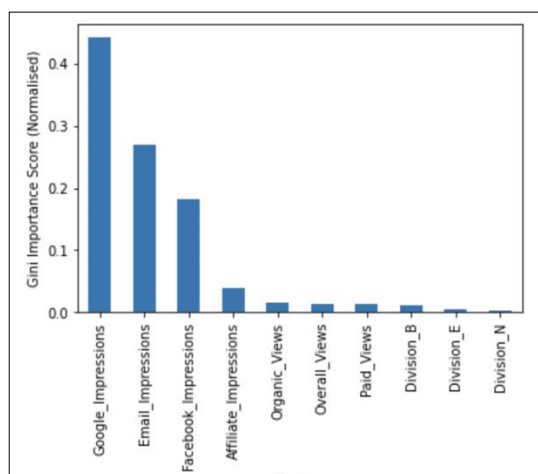
Figure 3: Feature Selection using Random Forest Regressor

Feature selection was performed using random forest regression.

By selecting the top ten features we implement the cross validation on linear regression modeling to enhance the model accuracy by evaluating the R-squared and Mean Square Error metrics. Result showcases the model suggested ROIs compared to actual total spends for media channels. According to figure 4., the media

mix modeling for the above dataset, we infer that Google search impression has the highest return in comparison to other media channels. Therefore, when selecting from media mix models, organizations should bear in mind the percentage of the model outcomes that are data-driven, to the model results driven by the assessment to manage the challenge.
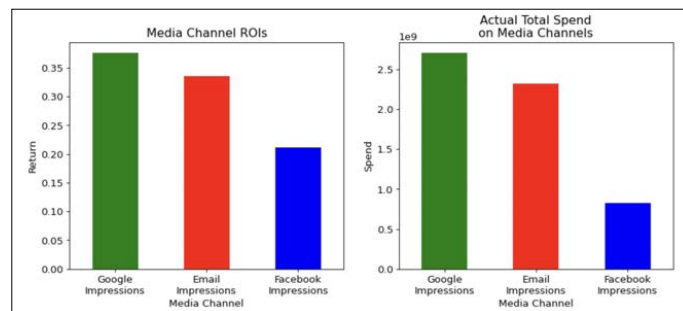

Figure 4: Return on Investment per Media Channel

Conclusion and Future Work

Finding the ideal marketing media mix is not a destination, but a continuous journey. It's an ongoing quest for relevance, fueled by audience insights, strategic alignment, channel exploration, and data-driven optimization. By embracing this iterative approach, brands can weave together an engaging set of messages that not only captures fleeting attention, but cultivates lasting engagement and fosters brand loyalty. Companies can traverse the increasingly complex media ecosystem and optimize their spending for better results by adopting machine learning. In the ever-evolving digital landscape, the ideal media mix becomes a synergy of marketing and digital strategies, constantly adapting to the changing media behavior and ensuring brands dance in perfect harmony with their audience [4,5].

While this paper explores the fundamental principles of building a marketing media mix, several areas merit further research and investigation: application of AI in basic tenets of marketing i.e audience targeting and creative optimization, rise of immersive virtual experiences and its integration into marketing and effectiveness of cross channel attribution to name a few. Continuing research and exploration of these topics will provide marketers with the tools and understanding needed to create impactful campaigns in the years to come.

References

1. Baker MJ (1992) The Marketing Mix. In: Marketing Strategy and Management. Palgrave, London 260-276.
2. Kevin Hartman (2019) How to bring your marketing mix modeling into the 21st century. Think with Google https://www.thinkwithgoogle.com/marketing-strategies/data-and-measurement/marketing-mix-modeling-tutorial/.
3. Thabit Thabit, Raewf Manaf (2018) The Evaluation of Marketing Mix Elements: A Case Study. International Journal of Social Sciences & Educational Studies 4: 100-109.
4. Mir Pedro, Sadaba Teresa (2022) The Ultimate Theory of The Marketing Mix: A Proposal for Marketers and Managers. International Journal of Entrepreneurship 26: 1-22.
5. Jose Francisco Sa Marques Rocha (2019) Media Mix Modeling. MGI https://run.unl.pt/handle/10362/94986.