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Marketing Mix Model:
The opportunities behind
open-source techniques

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Contents

In a dynamic landscape of marketing and media evolution, understanding how much the media efforts are driving business outcomes is paramount to success. Marketing Mix Model (MMM) comes to the table to help advertisers answer this question, going above and beyond by optimizing the media mix to maximize results.

Deloitte's benchmark data reveals a significant achievement: **44% of advertisers have successfully enhanced their Return on Investment (ROI) by at least 10%**, all while maintaining the same marketing budget. This remarkable feat was made possible through the implementation of an optimized investment allocation strategy facilitated by MMM[1].

1. Real, C., & López, V. (2022). Marketing Mix Modeling (MMM): An Analytics tool for measuring advertising effectiveness. Deloitte.

Open source
is the new MMM

Marketing Mix Modelling (MMM) has long been a fundamental tool for optimizing media strategies. Nevertheless, the evolution of MMM in recent times can be attributed to the dynamic open-source landscape, harnessing advanced modelling techniques.

The shift from licensed software to open-source solutions is gaining momentum. This pattern is evident in the field of MMM, with a 32.1% increase in searches related to "MMM" since 2022[2]. These techniques have witnessed a fast-pacing development, with open-source environments emerging as a pivotal factor in the evolution of the field.

Open-source techniques have revolutionized the way the community approaches their way of measuring media strategies, marketing campaigns, and advertising efforts.

The accessibility has led to a proliferation of creative and data-driven marketing

measurement, fostering a culture of experimentation and innovation within the industry. As a result, the MMM landscape continues to evolve rapidly, with open source serving as a driving force behind its ongoing transformation, making it more dynamic and adaptable than ever before.

Numerous open-source techniques exist for conducting a Marketing Mix Model, and among them, Robyn (developed by Meta), Lightweight (developed by Google but not an official product), Orbit (developed by Uber) and PyMC-Marketing (developed by PyMC) stand out as four of the most favoured within the community. While these tools employ diverse modelling techniques, what's particularly noteworthy is the substantial common ground they share, especially when it comes to the results of the modelling process itself.

2.   Google Trends. (2023). Trend data for Marketing Mix Modelling. Retrieved November 22, 2023.

This paper aims to answer the challenges of internalization, which means if a company has decided to internalize the MMM process,

what should they have in mind?

Empowering the community with open-source MMM

Navigating through the open-source adoption trend, reveals a change of paradigm: companies bet the wisdom of the crowds, beats proprietary software. This should come as no surprise, as notable open-source initiatives have ended-up powering bits from the world as we know it (e.g., the Web).

There are intrinsic characteristics behind the open-source successful use cases, among which, stand out:

COST-EFFECTIVENESS

Free to use, even for commercial purposes, is a common pattern among open source software.

INNOVATION

As people from diverse backgrounds contribute, new ideas and improvements emerge.

FLEXIBILITY

The source code is modifiable to fit their specific needs, tailoring customized solutions.

These three key principles play a relevant role in the industry, where the aim is to cut down on expenses, stimulate innovation in an ever-changing world, and strike a balance to ensure the adaptability of the solutions.

However, companies should also be aware of potential risks involving technologies of such degree:

SUPPORT

Support can be limited or unavailable, and users often rely on community for troubleshooting.

INTEGRATION

Integration with other software components can pose a challenge.

EXPERTISE

To tailor and adapt an open-source model, an internal analytics team is imperative.

To succeed, the ongoing shift requires a collective commitment that spans every level of the organization.

Regardless, open-source unlocks the development and crafting of models, as it reduces the friction related to it, by democratizing the development worldwide.

Transposing these principles to the MMM ecosystem, open-source has meant a turning point in the industry, with companies leveraging models and tools that were before out-of-reach.

It is worth noting how newer approaches enrich the ecosystem, bringing varied and adaptable solutions through Robyn, Orbit, Lightweight or PyMC-Marketing. This further empowers companies to freely tailor and adopt the solution better fits their own purpose.

The change evoked by open-source is so vast, companies are now shifting their focus: efforts are diverging from the model development itself, and the pressure now resides in the capability to strategize and understand the best fit to implement such models to their current workflow.

From a strategic standpoint, companies face three alternatives:

- **In-house:** an internal team builds and maintains the solution, requiring both domain-knowledge and technical expertise to succeed. They may develop their own model or plug in an already developed open-source model. This approach is gaining popularity, accounting for a 44% of the total market share.[3]

- **Outsourcing:** consists in a complete MMM operationalization delegated to third party specialists, providing an end-to-end solution to the client. It provides a high degree of satisfaction, with a 93% of respondents finding their efforts effective.[3]

- **Hybrid:** merges the workflow between the company and third-party specialists. While the company leads and maintains the solution, the third-party acts as provider of guidance in diverse aspects concerning strategy, operationalization, or technical expertise knowledge.

3.   Sagefrog, (2023). 2023 B2B marketing mix report: Data-driven insights for your marketing plan. Sagefrog.

Each of these approaches highlights certain trade-offs, which are summarized as follows:

IN-HOUSING	HYBRID	OUTSOURCING

IN-HOUSING

- Greater control and customization of the process
- Better integration of the pipeline, with other companies workflows
- More cost-effective over time

- Limited perspective on industry trends, best practices and benchmarks
- Resource-wise constraints
- Potential for bias

HYBRID

It combines the **benefits of both** approaches but **requires strong management skills**

OUTSOURCING

- Access to specialized expertise
- Cost-effective for one-off projects
- Avoid internal bias

- Lack of company-specific knowledge
- Less control of the process
- Potentially higher cost over time

Amid the current trend, in a growing adoption of an in-house approach, companies are more likely to face new challenges, ranging from organizational to operational difficulties.

To succeed, the ongoing shift requires a collective commitment that spans every level of the organization.

This commitment must be embraced from the highest echelons, including the Chief Marketing Officer (CMO), and extended to the depths of the data science team. It's a journey that requires alignment and engagement across all facets of a company, bringing together the expertise and dedication of the Marketing, Operations, and Sales teams to truly internalize and champion the MMM philosophy.

Below, we detail the most common challenges faced by companies worldwide in their journey towards internalization, based on our experience.

Navigating the challenges of internalization

Certainly, the shift from outsourcing with a third party to an internalized process represents a significant change in how companies approach the MMM.

With this mindset, there are some key points to have in mind when a company wants to internalize their MMM:

- **Establishing a data science team is imperative for internalizing the process.** This team should not only own Data Science expertise but also a solid foundation in business and marketing. Furthermore, they should have experience in utilizing open-source techniques with proficiency in either R or Python.

- **The involvement of the appropriate sponsors within the organization is pivotal for the successful internalization of MMM (Marketing Mix Modelling).** Traditionally, CMOs have been the primary stakeholders in MMM, but the role of the CFO is gaining increasing significance in the marketing mix conversation. Ultimately, the CFO's primary goal is to safeguard and enhance the financial well-being of the organization, and the Marketing Mix plays a crucial role in helping the organization accomplish this mission. Moreover, this shift makes more sense considering the holistic business analysis MMM comprises, involving several areas of the company.

- **Setting up the infrastructure to make frequent decisions based on MMM results involves implementing a range of tools,** from visualization aids to simulation capabilities.

- **Throughout the entire MMM journey, collaboration between marketing/ business and data science teams is essential.** This collaborative effort is instrumental in merging scientific insights with business acumen to enhance ROI. By building a robust model that closely mirrors real-world dynamics and effectively addressing pertinent business questions, MMM becomes a valuable asset.

Embarking on the path of internalization can indeed pose challenges, especially when unsure of where to commence. This is where a hybrid approach can serve as an advantageous initial step. A smoother transition can be realized through this hybrid method, involving a third-party expert to steer the workflow, engaging the relevant stakeholders, ensuring the availability of requisite software and hardware resources, and even providing training to the data science team. This approach is increasingly gaining favour as it paves the way for the self-sufficiency of the company in internalizing MMM.

All in all, internalization still poses a greater challenge in companies, independently of their tenure, as many struggle to follow a reproducible, secure, and actionable steps. For those companies, we present a framework of best practices, to guide them in the process of internalization.
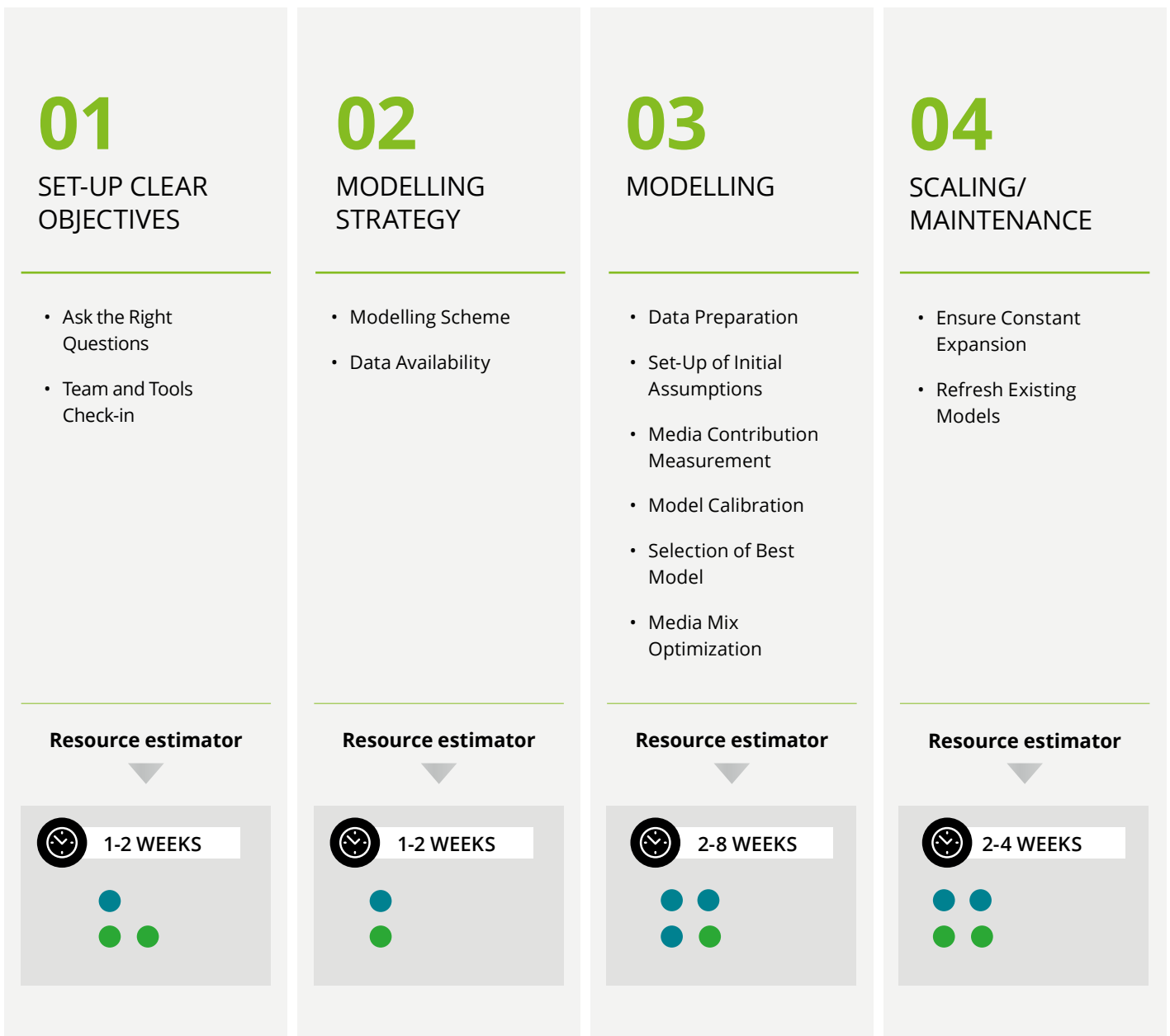
The key to success:

an actionable framework

Failure rate in the internalization of MMM techniques grow exponentially in absence of a clear strategy, with some MMM structures collapsing even before making it to production.

Our experience showcases how the aforementioned challenges, habitual to companies embarking to this internalization, can be easily overcome through Deloitte's MMM framework.

Deloitte's MMM framework sets up a clear and reproducible path of four stages, delivering best practices and empowering the ability to achieve state-of-the-art results. Let's delve deep into the core components of this framework:

01
SET-UP CLEAR OBJECTIVES

- Ask the Right Questions
- Team and Tools Check-in

Resource estimator

▼

🕐 1-2 WEEKS

● ●

02
MODELLING STRATEGY

- Modelling Scheme
- Data Availability

Resource estimator

▼

🕐 1-2 WEEKS

●
●

03
MODELLING

- Data Preparation
- Set-Up of Initial Assumptions
- Media Contribution Measurement
- Model Calibration
- Selection of Best Model
- Media Mix Optimization

Resource estimator

▼

🕐 2-8 WEEKS

● ●
● ●

04
SCALING/ MAINTENANCE

- Ensure Constant Expansion
- Refresh Existing Models

Resource estimator

▼

🕐 2-4 WEEKS

● ●
● ●

● Data Scientist　　● Marketing Specialist

Average estimation, an accurate estimate of required resources and commitment time will vary significantly based on factors such as team composition, project objectives, scope, data quality, and others.

01

Set-up Clear Objectives   1-2 WEEKS

Make the most of MMM by setting clear goals. Without them, it's easy to get lost. Be sure you know what success looks like, and check that your team's abilities and tools match your ambitions.

Simple Steps to Take:

Ask the Right Questions
Come up with 3-5 specific questions you want MMM to answer. This helps you focus. For example:

- How much do we get back for what we spend on each marketing channel?
- What's the smartest way to use our marketing budget?
- How many extra sales do our ads bring in?

Team and Tools Check-In
Make sure your team's skills are up to date and fit well with the technology you have. Have at least two people who are good at each thing you need, so they can work well together.

02

Modelling Strategy   1-2 WEEKS

Addresses the preliminary decisions before any significant data handling or modelling begins. Without a solid strategy, the entire modelling process might fall into inaccuracies and inconsistencies.

Simple Steps to Take:

Modelling scheme
Understanding the intricacies of your brand and aligning the model to your business structure is paramount for a successful MMM implementation.

Select the right model scheme for your brand
Ensure that the modelling approach you choose addresses media planning questions in a manner that is collectively exhaustive and mutually exclusive. These questions form the cornerstone of marketing mix modelling.

Align the model structure with the business
This could translate to creating models by product, brand, or region depending on how the company is structured.

Data Availability
Data should be collected in a manner consistent with the modelling scheme to maintain coherence in the analysis. The model's accuracy is often enhanced by using the most granular data available (e.g., daily data rather than weekly), as it can capture variations more precisely and can be more responsive to changes in marketing tactics.

03
Modelling 🕐 **2-8 WEEKS**

Comprises diving deep into data, understanding it, and running analyses. Incorrect or rushed modelling can lead to false insights and potentially expensive business decisions.

This step can be demanding time-wise. In this regard, ML-based models bring to the table an increased agility, reducing time to market to the minimum.

PROGRAMMING AND MEDIA PLANNING SKILLS ARE NECESSARY IN THIS PROCESS

1. DATA PREPARATION

Prioritize the use of well-configured data to prevent misleading insights in your MMM.

Emphasize the importance of thorough data exploration, **wrangling, and cleaning.**

2. SET-UP OF INITIAL ASSUMPTIONS

Assumptions should **mirror reality. Both relevant and irrelevant variables** must be considered to prevent model underfitting or overfitting.

EDA can help identify the appropriate variables and eliminate irrelevant ones.

3. MEDIA CONTRIBUTION MEASUREMENT

Regularly review and adjust hyperparameters for media contributions. They should depict **real-world behavior**, like saturation curves, precisely.

4. MODEL CALIBRATION

Avoid models that don't reflect real-world scenarios.

Calibration fine-tunes the model to ensure its accuracy, especially after hyperparameter adjustments**.**

5. SELECTION OF THE BEST MODEL

A model's performance shouldn't only be accurate, it should also **align with business realities.** This ideal model strikes a balance between **technical precision and business relevance.**

6. MEDIA MIX OPTIMIZATION

The **ultimate goal of MMM** is to achieve an optimized budget allocation that yields maximum returns. **Correct alignment with reality** is essential to avoid budget misallocations. **Logical allocation decisions** based on model insights are paramount.

04
Scaling/Maintenance 🕐 **2-4 WEEKS**

Scaling and updating models are essential steps to ensure that your Marketing Mix Model remains relevant and accurate.

Simple Steps to Take:

Ensure constant expansion
A successful data-driven strategy continuously incorporates new significant models that align with emerging trends and market realities.

Refresh existing models
It's vital to have a consistent reporting tool that updates models with new incoming data at a regular frequency, whether it's monthly, weekly, or even daily. This approach makes MMM more actionable and timelier. When utilizing tools like Robyn, the refresh function is handy. Robyn aggregates results from both the initial and new builds, producing comprehensive reports and corresponding visualizations.

Conclusion

Using open-source tools for Marketing Mix Modelling can greatly improve how we measure and adjust media strategies. But to get the full advantage, the whole company needs to be involved.

Open-source tools let companies make their own advanced MMM systems. But doing it in-house has its own challenges. Companies need the right team, the right tools, and a plan to use data effectively. A good plan can help companies know what steps to take, from setting goals to maintaining the system.

As MMM keeps changing in the open-source world, it's important to match data science methods with business goals. By working together and using the right strategy, companies can understand better how their marketing money is working. This helps them spend their budget smarter, make their campaigns better, and grow their business. The process might be tough, but the benefits of using MMM in-house are worth it.

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