Software review

Which part of my marketing spends really works? — Marketing mix modelling may have an answer

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Abstract   The last few years have seen a growth in the use of statistical techniques to monitor the effectiveness of integrated marketing activities. This paper explores one of these techniques, marketing mix modelling (MMM), and describes at a high level the key components of an MMM solution.

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INTRODUCTION

'I waste half of the money I spend in advertising. I just don't know which half.' This is a famous quote first attributed to John Wanamaker, a US store merchant, in 1862. The sad news is that it is still heard all too often today, but the reality is that in today's modern marketing function there is no excuse for not measuring the effectiveness of all marketing activities.

The following paper explores the use of marketing mix modelling (MMM) to manage marketing spend.

MARKETING MIX

The following section provides a brief description of marketing mix.

The marketing mix model (also known as the 4 Ps) can be used by marketers as a tool to assist in implementing a marketing strategy. It is important to understand that the marketing mix principles are controllable variables. The marketing mix can be adjusted on a frequent basis to meet the changing needs of the target market and the other dynamics of the marketing environment.

The 4 Ps are a part of the organisation's strategic planning process and consist of analysing:

— Product
— Price
— Place
— Promotion

The function of the marketing mix is to help develop a package (mix) that will not only satisfy the needs of the customers within the target markets, but will simultaneously maximise the performance of the organisation.

Marketing mix modelling has been used to address the four 4 Ps but the primary focus of this paper will be on P for Promotion.

WHAT IS DRIVING THE DEVELOPMENT OF MMM?

With advertising being a major part of most marketing budgets, it is not surprising that it is getting a great deal of attention from finance departments. Showing a clear and measurable return on investment (ROI) on marketing spend is now becoming the norm, as it should be. Marketing competes for limited corporate resources with other functions in any business and must justify its slice. For some organisations, MMM could provide a valuable tool in managing spend across the marketing mix.

WHAT HAVE BEEN THE KEY ENABLERS FOR MMM?

There are a number of factors that have led to the development of MMM and other approaches to the measurement of marketing effectiveness. These include:

— Availability of good quality and granular internal and external data that is needed to support the statistical analysis.
— Availability of technology to store and process the potentially large volumes of data.
— Availability of advanced analytical techniques such as:
  • Forecasting;
  • Behavioural modelling;
  • Simulation;
  • Optimisation;
  • Activity-based costing (ABC).
— A body of knowledge on how to use these techniques to manage marketing effectiveness.
— Visionary organisations that have given the science credibility in the commercial market place. These companies include:
  • Coca Cola;
  • Pepsi;
  • Bayer;
  • Proctor & Gamble;
  • Bristol-Myers Squibb.

WHAT PROBLEM IS MMM TRYING TO ADDRESS?

Sales of products and services are driven by a complex array of factors, so measuring the effectiveness of marketing needs to recognise and understand these factors.

The following are some of the key factors that have been shown to affect sales in the consumer goods sector:

— Retail price
— Wholesale price
— Packaging
— Channel promotional activity
— Seasonality
— Economy
— Weather
— Competitive activities
— Advertising
— Ad-copy
— In store merchandising
— Co-branding
— Events
— Direct marketing activities

Understanding the interaction between these factors is the key to the effective management of marketing investment. The complexity of this problem means that it can only really be addressed

through solid, statistically-based analysis such as that provided by MMM.

WHAT DOES MMM DO?

Marketing mix modelling applies statistical processes to determine:

— The factors that drive sales;
— The relevant importance of each of these factors;
— ROI for various activities; and
— The optimal mix of spending in each of the activities.

WHAT IS INVOLVED IN MMM?

The following provides an overview of the key steps in MMM:

1. Build a model that analyses and predicts historical sales.
2. Test the predictive ability of the model on a hold-out sample.
3. Refit using all the data and predict the future.
4. Compare actual to forecast sales performance and determine incremental revenue.
5. Apply financial data and determine ROI.
6. Model the influence of individual factors.
7. Simulate the impact of different marketing plans.
8. Develop and deploy the optimal marketing plans.

WHAT ARE THE USUAL DATA INPUTS FOR MMM?

Central to the success of MMM is available internal and external data at the right level of detail. The following are examples of the types of data that are typically used:

— Monthly/weekly sales data with causal factors —

- Including competitive information
- Preferably, ACNielsen/IRI and/or Retailer POS data.

— Monthly/weekly advertising spend in national media —

- National/local television, cable, print
- Preferably, GRPs
- Value.

— Marketing event calendars —

- Consumer promotions
- Trade promotions
- Other related consumer events.

— Other data sources —

- Economic
- Demographic
- Weather.

WHAT ARE THE PHASES IN A TYPICAL PROJECT?

MMM projects are normally broken into a number of phases. The following is an example:

— Phase 1
1. Develop initial model and analyse ROI.
2. Define project.
3. Collect data.
4. Build analysis environment.
5. Develop and test model(s).
6. Analyse ROI.

— Phase 2
1. Refine model and determine optimal mix.
2. Extend data.
3. Refine model.
4. Build simulations.
5. Deploy and measure refined marketing plans.

— Phase 3
1. Market test.

A typical project would take 4–6 months, with the models being re-calibrated on a monthly or quarterly basis thereafter.

WHAT ARE THE CRITICAL SUCCESS FACTORS?

The following factors have been found to be critical to success:

- Quality of data;
- Breadth of internal and external data;
- Granularity of data (minimum monthly);
- Availability of robust statistical functionality;
- Accurate historical marketing and pricing data; and
- Technical architecture that supports the required performance.

WHAT ARE THE KEY COMPONENTS OF A SOLUTION?

A comprehensive MMM solution will need to consist of the following components.

Extract transform load (ETL) capability

MMM requires a wide range of data to be obtained on a regular basis; the solution should, therefore, have extensive extract, transform and load (ETL) capability to manage the complex data management problem. Most solutions require:

— Data to be loaded from a large number of sources;
— The management of both internal and external data;
— The matching of data from different sources;
— The manipulation of large volumes of data;
— The aggregation of data; and
— Creation of derived data items (>500).

Forecasting capability

The ability to apply complex forecasting techniques against large data sets is

important; many applications can only cope with small data volumes. This will not be adequate for MMM.

Predictive modelling capability

In addition to being able to forecast, a good MMM solution should be able to model the drivers for the forecasts and to determine the impact of these drivers.

Simulation capability

In order to do 'what if' analyses, a MMM solution should be able to support a range of simulation techniques. As an example, a user may want to test the impact on sales of increasing advertising spend in a particular region for product A.

Optimisation capability

A natural extension to the simulation capabilities is to allow an optimisation process to determine what the optimal spend mix should be. This capability is only now being added to MMM solutions but is proving popular.

Reporting capability

Once the model has been developed and deployed, monitoring the performance becomes more critical. A good MMM solution will either provide solid reporting capability or integrate with one of the standard reporting environments. The availability of a 'pre-canned' reports will reduce the time to market and costs of delivery and show a proven domain expertise on the side of the vendor.

Data model

If a vendor has a proven track record in an industry, it will have developed a

standard underlying data model. Although not essential, the availability of an industry-specific data model will reduce the development time and ensure that the benefits from best practice are learned over time by the vendor.

WHAT ARE THE BENEFITS OF MMM?

The implementation of a MMM solution will allow an organisation to:

— Measure on a regular basis the effectiveness of advertising and other marketing spend.
— Optimise the marketing spend by understanding the drivers of sales and their impact.
— Simulate changes in the marketing plan.

WHAT TO LOOK FOR IN A SOLUTION?

There are a number of specialist consulting firms that can develop bespoke marketing mix models and these should be considered when an organisation has limited resources and/or skills in this area. This can be a costly route if more than one or two models need to be developed. It also results in a 'black box' solution with no real transfer of knowledge and development of internal domain expertise. It has, however, provided a valuable testing ground for some organisations.

The typical spend per model is, excluding external data.

When looking for a technology vendor to deliver an MMM solutions the usual basic rules apply. Look for:

— Financial viability;
— Product vision;
— Functionality; and
— Integration between components.

In addition, the following specific advice is given for those looking to implement a MMM solution.

Proven technology

This is an embryonic technology area and, as such, an organisation should look for proven technology or recognise the potential risk associated with using a leading edge vendor.

Structured methodology

It is important that the vendor can demonstrate a structured and rigorous methodology. Look to documentation and reference sites to access this aspect of the solution.

Experienced delivery team

There are few people that really have experience in this area, so organisations should make sure that the credentials of the consultants being used by the vendor are reviewed. It is not adequate to have expertise in the various statistical methods, it is important the individuals have directly-relevant MMM work experience.

Repeatability of models

The solution should be implemented in a manner that allows the models to be recalibrated and/or, where necessary, re-built on a regular basis with ease. Processes will need to be modified to monitor the impact of changes in the marketing mix. The associated measurement systems should produce the required reports and metrics in an automated and consistent manner.

Exploit existing technology investment

Where possible, the solution should leverage the existing investment in technology, particularly reporting.

Partnership approach

It is likely that both the client organisation and the vendor will be learning as the project evolves, organisations should, therefore, make sure the vendor is really looking to work in partnership. The organisations may want to add additional functionality, test new statistical approaches or add new data sets. It should ensure that it does not buy from a 'hit and run' vendor (a vendor who sells the product and then runs away without supplying support), unless that is what you are looking for.

Make sure vendor is independent of outcome

A number of the mainstream advertising agencies have started to develop MMM solutions; their choice as a vendor class needs to be done with extreme care. As a group that is directly affected by the outcome of any marketing mix changes (eg reduction in advertising spend), their work may be influenced by the potential outcome.

Carefully evaluate external data costs

The cost of the external data can be significant. Make sure that each source is carefully evaluated and, where possible, only pay for the data that is used. Many of the vendors act as re-sellers of the data and add heavy margins. Where possible, negotiate hard with the vendor or go direct to the data provider. Remember that this type of data can be used in other parts of the organisation so make sure the licence does not limit use to the MMM.

Overall cost

The technology and professional services costs for a comprehensive solution will push the costs of an MMM solution to between £0.5–1m. So a solid business case will be required, as for any major investment.

CONCLUSIONS

Pressures from finance departments to ensure effective return on marketing spend is forcing most marketing departments to look seriously at where the money is being spent across the marketing mix. CMOs are now realising that evidence-based decision making needs to become a fundamental discipline in marketing. The last few years have seen the application of advanced statistics in the form of MMM to the problem of balancing spend across the marketing mix. It is a new application of proven statistical techniques, however, the technology solutions are still immature so care is required when selecting a vendor. But the high level of spend on advertising and other elements of the marketing mix means the business impact of better decision making is significant. The author believes that MMM will have an important role to play in large organisations with heavy marketing spends, especially in advertising. With MMM, there really is no excuse for not knowing which half of the advertising spend is working.

Acknowledgments

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Further reading and useful websites

BetterManagement.com
    http://www.Bettermanagement.com
Marketing Management Analytics
    http://mma.com/marketing-mix-models.htm
SAS Inc, Global http://www.sas.com
Pointlogic, Holland http://www.pointlogic.nl
Coppock, D. S. (2001) 'Making sense out of marketing optimisation', *DM Direct*, October 12th.
Bender, J. D. and Link, R. (1996) *The Value of Survey Data in Marketing Mix Models*, has been presented at the American Marketing Association Advanced Research Techniques Forum, Beaver Creek, CO, http://www.marketinganalytics.com