A RESPONSE MODEL TO OPTIMIZE RESOURCE ALLOCATION FOR THE MARKETING COMMUNICATION MIX

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Abstract: Currently, the main problem that companies are facing in the consumers market, it's not the availability of information, but keeping a good level of knowledge necessary to drive the right decisions. An approach in the decision making process such as the resource allocation process for communication, may require the use of a decision model on how the market should respond to different levels of budget. Managers can use such a decision model before taking a decision, to explore the consequences of different budget levels on sales and profit.

1. INTRODUCTION

Marketing managers often have to take decisions about products features, prices, distribution and promotion methods. In making these decisions, managers must choose between several alternatives, in a complex and uncertain world. Marketing decisions involve three major entities: marketing processes, the person assigned to take the marketing decision and the marketing management support system. Marketing processes include the behavior and actions of customers, distributors, competition and other relevant parts of the market. No doubt, it is necessary to rethink the role of marketing research and structure the marketing models in order to develop more appropriate analytical methods, suitable for studying the current business environment and the decision-making scenarios.

In literature, is a lack of papers and research directions regarding the development of some engineering methods and tools in solving the current marketing problems. It is well known the big difference between the academic world that analyzes and solves problems in a thorough and consistent way and, managers whose activities can be characterized by variety and discontinuity. This bridge can be enhanced by developing the new field of marketing engineering.

As Gary Lilien mentions in [3] marketing engineering is considered "*A systematic approach to harness data and knowledge to drive effective marketing decision making and implementation through a technology-enabled and model-supported interactive decision process*". Most often, combining the decision support tools with managerial judgments leads to the best results. The purpose of marketing engineering is actually to simplify the managerial context and to create a decision architecture which allows focus on core issues.

2. THE RESOURCE ALLOCATION PROCESS FOR COMMUNICATION ACTIVITIES

As in [2] there are two useful models used in the communication process: a macromodel and a micromodel. The macromodel emphasises the most important factors for an effective communication while the micromodels focus of customer responses to certain communication activities. Marketing communication activities drive sales by increasing brand awareness of facilitating the consumer-brand connection.

One of the most difficult marketing decisions that a company faces is how much to spend for the communication process. Although communication is usually considered a current expense, it is actually an investment in brand building and consumer's loyalty.

Factors influencing communication resource allocation [2]:

• Stage in the product life cycle: new offers usually require large communication budgets to make their presence known in the market and to gain consumer's confidence. Well-known brands usually have a lower budget in proportion with the sales level.

• Market share: brands with high market share typically require less communication budgets to maintain their market share. But to increase market share, this requires a massive spending.

• Competition: in a market with many competitors and large communication budgets, a brand should be promoted more intensively to make itself known.

• Frequency of promotion: the number of repetitions needed to get the message to customers has a clear impact on the communication budget.

• Alternative products: brands belonging to categories with only a few differences one form another like, beer, soft drinks or banking products, require intense promotion to differentiate their brand image from the competition in the markets.

In a study on resource allocation, [4] and [5] found that managers allocate less resources for the communication activity in the following situations: as the products reached the maturity stage of the life cycle, when a brand is well differentiated in relation to its competition, when managers were rewarded for short-term results, when retailers gained more power and when managers had less experience in the company.

As in [1] there are several alternatives to establish the communication budget.

1) *The percentage from sales method* is the first one and, is also a widely used method. It involves applying a certain percentage to the sales volume (actual or anticipated) or to the selling price. It is simple to use and easily allows an increase in the budget during high sales periods. Its limitations refer to the fact that it doesn't provides a way of distributing resources on promotional instruments and can not provide sales growth during periods of low activity.

2) *Imitating the competition method* it is a widely used method and requires the company to allocate an amount for promotional activity similar to its competitors. Takes into account competitions' activity and causes stabilization in competition. May lead to the situation that no competitor will improve its market position and that the competition has the same objectives.

3) *The available amount method* it is a method mainly used by the small companies and implies using the remaining financial resources available after covering all other expenses in the company. Assumes limited funds, stimulates creativity, aiming maximum results with the available resources. It ignores the marketing goals.

4) *The objectives method* assumes that first the marketer must define clearly what the marketing activity should bring to the company. For this, the main objectives and the methods to achieve these tasks are set. The cost of all these activities represents the actual communication budget. It is based on the communication objectives. Focusing on these objectives provides the most efficient use of funds.

The great variety of dedicated software made easier working with different mathematical representations of marketing phenomenon such as resource allocation in marketing. For example, an intelligent software model incorporates an equation or a response model that the manager uses to determine the effect of communication on sales and revenues and to determine whether it is appropriate to increase or decrease the communication budget. Response models are basic tools that can transform a basic model into a intelligent one. Response models are critical in addressing systematic strategic or

tactical marketing decisions such as resource allocation, targeting or positioning a product or company. Without models describing how customers and markets can respond to different marketing actions is very difficult to assess the costs of certain decisions. Response models form the core of marketing engineering and marketing decision process. Marketers work with many variables by analyzing or trying to influence marketing phenomenon, which makes an estimation tool for research such as regression analysis, not only desirable but also necessary.

The analysis of resource allocation is a tool used to optimize resources dimension for example, promotion budget, and resources allocation such as: market segments or products.

As presented in [3] the questions that any company should answer when setting budgets for promotion activities are:

1. How much to spend within a determined period of time?
2. How much to spend for every element in the marketing mix? What amount from the promotion budget should be spent on advertising and other impersonal forms of communication?
3. These individual budgets should be allocated on clients or on geographical areas, in time?

All these questions are in fact closely related to each other. It is almost impossible to be asked the question *How much to spend?*, without determining how that budget will be spent. So, the answers from the previous questions can be used to explore each element by it self.

3. A RESPONSE MODEL FOR RESOURCE ALLOCATION WITHIN A ROMANIAN ADVERTISING COMPANY

3.1. CURRENT SITUATION

The case study refers on how the financial resources for the communication activity of an advertising company from the west side of Romania, should be assigned in order to increase revenues for every communication channel. The available budget for promotion was 14.000 Euros. The budget was allocated on the following promotion tools: Internet, Television, Radio and Outdoor Prints. The financial effort and estimated revenues for each promotion tool are presented in Table 1.

Table 1. Efforts and estimated revenues / Segments

Efforts and outcomes / Segments	Internet (Euro)	TV (Euro)	Radio (Euro)	Print Outdoor (Euro)
Promotion budget	3000	10000	2000	8000
Revenues	6000	12000	3000	10000

3.2. ANALYSIS OF THE RESOURCE ALLOCATION PROCESS

The analysis of the resource allocation process was performed using Marketing Engineering for Excel software package, module Resource Allocation. To perform the analysis, first the current communication budget of the company and estimated revenues must be listed and then, the calibration data used in the response model. In the end, the obtained scenario will present how to achieve higher revenues given the same communication budget and promotion tools chosen above.

Table 2 presents the calibration data, where "None" = 0 and "Saturation" = infinite and the rest of the data is expressed in Euros. These data represent in fact how revenues can be affected by changes in input variables for each segment separately. For example, what level of revenue can be achieved with a 50% increase in the online promotion budget.

Table 2. Calibration Data

Effort levels / Segments	Budget for Internet (Euro)	Rev for Internet (Euro)	Budget for TV (Euro)	Rev for TV (Euro)	Budget for Radio (Euro)	Rev for Radio (Euro)	Budget for Outdoor Prints (Euro)	Rev for Outdoor Prints (Euro)
Lowest effort	None	0	None	0	None	0	None	0
Low effort	1500	1600	5000	5000	1000	2000	4000	4000
Current effort	3000	6000	10000	12000	2000	3000	8000	10000
Higher effort	4500	8000	15000	13000	3000	3500	12000	13000
Highest effort	Saturation	10000	Saturation	20000	Saturation	4000	Saturation	15000

To perform the analysis, a market response model was considered. To use the model, it was assumed that the company assesses its response function that calculates the relationship between the promotion effort and revenues for each segment. If the company estimates the response functions for each segment, can calculate the level of effort that should be devoted to each segment so as to maximize their profits and achieve their objectives. For example, for the Internet promotion, methods such as online advertising or pay-per-click, give the company the necessary metrics to estimate the relationship between promotional spending and results, for example, click through rate or conversion rate. This response model uses the following general structure:

The current problem: Finding a total budget B and subbudgets B1, B2, B3, B4 for the four elements of the communication mix, presented above.

Step 1: Determine market response from an expense level B1, or gross sales S1, expressed using a function S1(B1). The same operation will be performed for every communication element.

Step 2: Determine the gross profit *m,* associated to sales S1 by calculating what percentage from S1 represents profit, before considering B1. The same operation will be performed for every communication element.

Step 3: The subbudgets B1, B2, B3 and B4 will be calculated for maximizing the profit:

$$\text{Profit} = m1 \times S1(B1) + m2 \times S2(B2) + m3 \times S3(B3) + m4 \times S4(B4) - B1 - B2 - B3 - B4 =$$

$$= \text{sum of gross profit} - \text{communication costs} \quad (1.1)$$

considering:

$$B = B1 + B2 + B3 + B4 \text{ (constraints for the total budget)} \quad (1.2)$$

Other constraints may also limit the minimum or maximum spending in a given region, for a product or other analysis unit. Marketing Engineering models provide promotion budget related decisions using a model similar to the one described above.

The following section will present the response functions for each element of communication mix.

In Table 3,4,5,6 are presented the considered budgets for the four elements of the communication mix. Calibration data was calculated only for the three budgets considered above in Table 2, for every communication element. The calibration data and the values for the response curve have led to the representation of the response function from Figures 1,2,3 and 4. According to the following figures, the response curves are the visual representations of the actual scenario based on the current budget throughout the considered communication tools.

Table 3. Estimation of the response curve for the Internet

Budget for Internet (Euro)	Calibration data	Response curve
0	0	0
750		0.048327562
1500	0.266666667	0.291126415
2250		0.665930161
3000	1	1
3750		1.230096861
4500	1.333333333	1.375097497

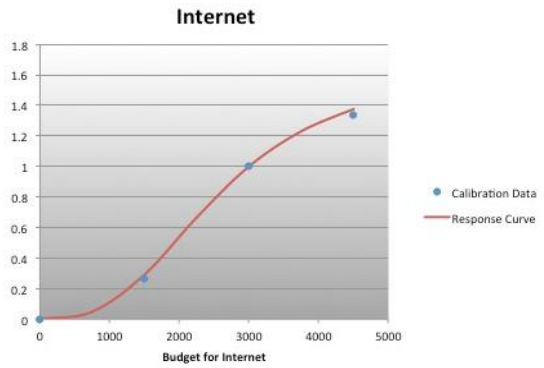

Figure 1. Response function linking current budget levels for Internet promotion with anticipated revenue levels

Table 4. Estimation of the response curve for TV

Budget for TV (Euro)	Calibration data	Response curve
0	0	0
2500		0.187827379
5000	0.416666667	0.506423304
7500		0.7888385
10000	1	1
12500		1.15098297
15000	1.083333333	1.258989171

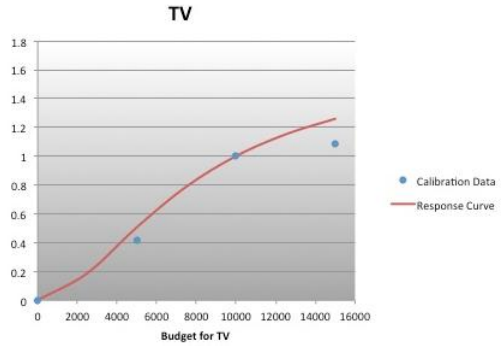

Figure 2. Response function linking current budget levels for TV promotion with anticipated revenue levels

Table 5. Estimation of the response curve for Radio

Budget for Radio (Euro)	Calibration data	Response curve
0	0	0
500		0.320444106
1000	0.666666667	0.657960163
1500		0.870531745
2000	1	1
2500		1.082185375
3000	1.166666667	1.137034233

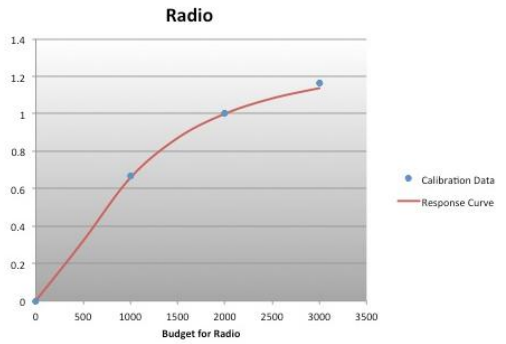

Figure 3. Response function linking current budget levels for Radio promotion with anticipated revenue levels

Table 6. Estimation of the response curve for Outdoor Prints

Budget for Outdoor Prints (Euro)	Calibration data	Response curve
0	0	0
2000		0.086371034
4000	0.4	0.388533
6000		0.738464654
8000	1	1
10000		1.167157145
12000	1.3	1.270923247

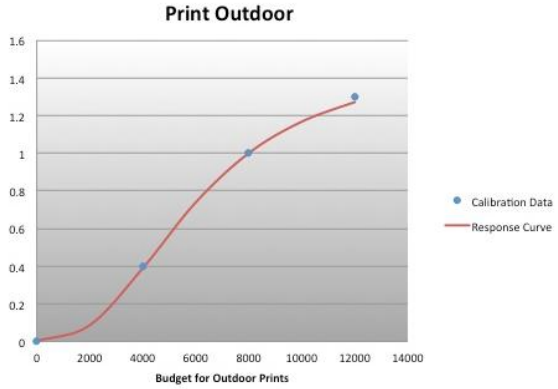

Figure 4. Response function linking current budget levels for Outdoor Prints promotion with anticipated revenue levels

3.3. MAIN RESULTS

Table 7 shows the manner in which the financial resources should be allocated for each element of the communication mix considered above, in order to achieve an increase in the estimated revenues.

Table 6. Estimation of the response curve for Outdoor Prints

Segments / Scenario	Internet (Euro)	TV (Euro)	Radio (Euro)	Outdoor Prints (Euro)	Total (Euro)
Base scenario	3000	10000	2000	8000	23000
Recommended scenario	4,344.2	8,830.0	1,480.4	8,204.7	22859.21943

As presented in Figure 5 for optimizing the resource allocation process, the budget for the Internet should be increased with about 1300 Euros, while the budget for Outdoor Prints seems to reach a relatively satisfactory level the required growth is only 200 Euros.

Following the recommended scenario might be a good approach in optimizing the resource allocation process for communication activities in order to deliver more business value to the advertising company. The presented model also can be considered in other resource allocation problems, not only to establish the communication budget.

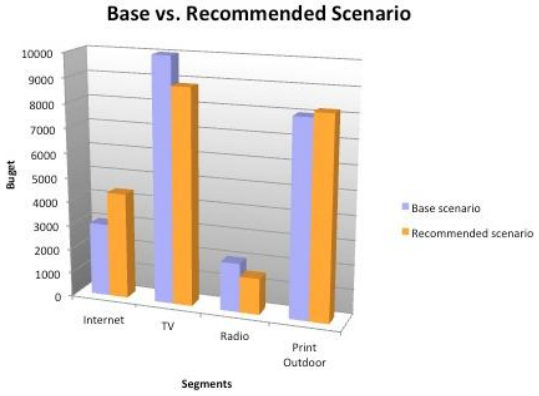

Figure 5. Base scenario vs. recommended scenario for maximizing revenues

4. CONCLUSION

With the evolution of technology managers require more and more support systems to optimize decisions related to communication activities, including decisions regarding financial resources for the promotional budget. Information on the effects of certain promotion activities are becoming much more numerous and companies need other efficient models to implement this information. Thus, operational models are continuously optimized to guide more effectively the decision making process in communication activities.

As presented in the present paper, the use of market response models allows companies to develop marketing programs, in this case communication marketing programs, tailored to specific market segments or even on individual customers.

The increasing amount of available data is a certain fact. Therefore, competitive advantage will not only result from holding large amounts of data but also by having in possession marketing systems to create models using the available customer data. Developing these models could improve the marketing decision process in a firm and thereby significantly improve the market position of the organization.

Considering that in the actual business environment every financial resource is valuable the use of such response models in the resource allocation process may bring real business value to a company. On long-term, the use of such models to optimize the resource allocation process will probably become a concern that all companies that want to keep their market position, will consider.

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